Journal
OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

AVMA Convention—San Antonio, Oct. 15-18, 1956

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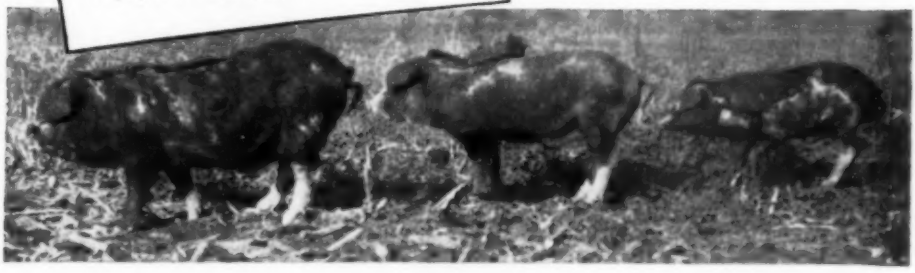

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AVMA ☆ Report

Veterinary Medical Activities

✦ President Floyd Cross participated in the program of the Washington State College Veterinary Conference held in Pullman, April 2-4. Dr. Cross also visited the Iowa State College campus on March 7, and spoke to the Iowa State Student Chapter.

* * *

✦ President-Elect Wayne O. Kester was on the program of the Alabama V.M.A., Montgomery, on March 18-20.

* * *

✦ AVMA officers and staff personnel participated in meetings on foreign animal diseases, sponsored by the ARS and held on a regional basis, as follows:

Phoenix, Ariz. — Executive Board Member J. M. Arburua, and Editor W. A. Aitken.

Stillwater, Okla. — Executive Board Member W. G. Brock, and Editor Aitken.

Bozeman, Mont. — Executive Board Member E. C. Stone, and Editor Aitken.

Ames, Iowa — Executive Board Member F. B. Young, and Editor Aitken.

Fort McPherson, Ga. — Executive Board Member R. S. Sugg, and Editor Aitken.

Storrs, Conn. — Executive Board Member Edwin Laitinen, and Editor Aitken.

* * *

✦ Executive Secretary J. G. Hardenbergh participated in the program of the Arizona V.M.A., Phoenix, on April 8. While in Phoenix, Dr. Hardenbergh inspected convention facilities since the AVMA has received an invitation to hold its 1960 meeting in that city.

✦ Dr. Hardenbergh attended a meeting of the Rural Civil Defense Committee in Battle Creek, Mich., on April 25-27.

* * *

✦ Assistant Executive Secretary H. E. Kingman, Jr., participated in the program of the Arkansas V.M.A., Little Rock, on March 27-29.

✦ On April 17, Dr. Kingman presented the subject "Veterinary Public Relations" to the students in the veterinary medical course at Walter Reed Army Institute of Research, Washington, D.C.

* * *

✦ AVMA Committees holding meetings at Association Headquarters included the Fellowship Committee of the Research Council, April 2; Special Committee on Insurance, April 3; and Special Committee on Veterinary Service, April 10-11.

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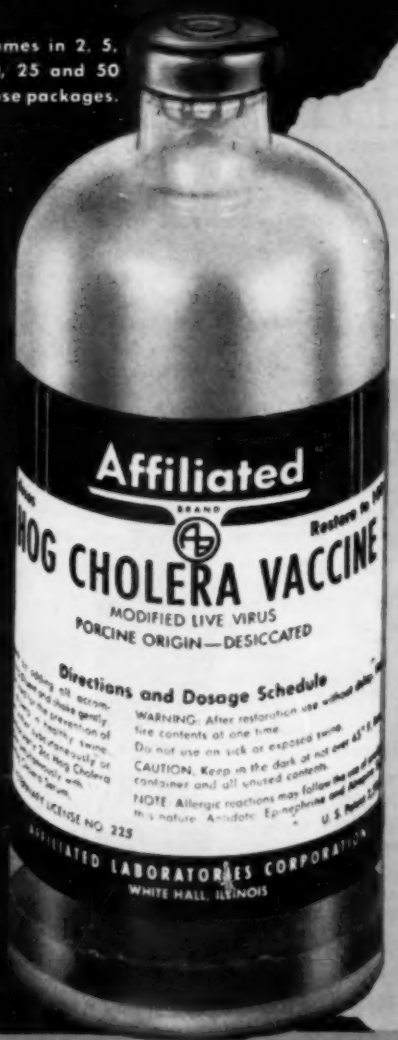
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References:

[1] Drury, A.R.: Vet. Med. 47: 407-411, 1952.

[2] Kitchen, H., and Waksman, S.: J.A.V.M.A., Vol. 127, No. 942: 261-274, Sept., 1955.

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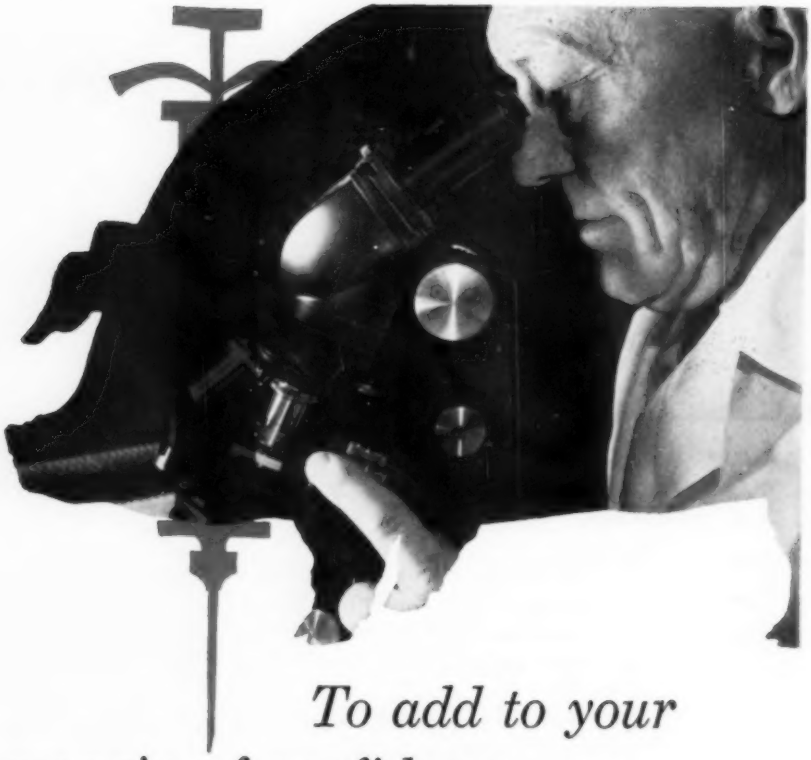

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JOURNAL
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Studies on Parturient Paresis in Dairy Cows with Particular Reference to Udder Insufflation

ROBERT R. MARSHAK, D.V.M.

Springfield, Vermont

THE PURPOSE of this paper is to examine further the changes which take place in the body fluids of cows with parturient paresis. Particular attention is focused on the effects of udder insufflation. The data presented deal not only with changes in the blood, but also with simultaneous changes in colostrum and milk. An attempt is made to evaluate some of the concepts of this metabolic disorder in the light of recent knowledge.

Since the discovery by a Danish veterinarian[1,2] that air insufflation of the udder of cows with parturient paresis resulted in recovery, students of the disease have been probing this phenomenon. In 1928 and 1929, Fish[3,4] reported increased levels of blood calcium, inorganic phosphorus, acid-soluble phosphorus, glucose, and lactose following insufflation therapy. Some of these observations were corroborated and enlarged by Niedermeier and Smith[5] in 1950.

EXPERIMENTAL METHODS

In a limited study, samples of blood and colostrum were collected from cows with parturient paresis immediately before udder insufflation and at varying intervals following insufflation—the shortest interval was two and one-half minutes; the longest, 20 hours. Only uncomplicated cases were included in the present study. In the case of Ayrshire cow 13F8899, udder insufflation was employed when she relapsed 30 hours following intravenous calcium-salt therapy.

Some pertinent data from cows not part of the insufflation studies are also reported.

Samples were collected in glass tubes which had first been rinsed with distilled water and dried. Blood was drawn from the external jugular vein with a 14-gauge California bleeding needle. One vial from each collection was oxalated for hematocrit determination. Colostral milk, before and after insufflations, was always collected from the same quarter. Samples were refrigerated immediately upon collection and the serum fraction of the blood was obtained by centrifuging each batch three times in order to assure complete removal of cellular elements. Constant refrigeration was maintained during shipment to the laboratory.

Laboratory work, with the exception of hematocrits, was done at the chemistry laboratory of the Massachusetts General Hospital in Boston. All analyses on serum and colostrum (or milk) were done in triplicate. Determinations were carried out for calicum,[6] inorganic phosphorus,[7] total protein,[8] nonprotein nitrogen,[9] sugar,[10] magnesium,[11] alkaline phosphatase,[12] ketones,[13] and hematocrit.[14] Complete chemical data were not obtained for every sample.

Electrophoretic studies of plasma proteins before and after insufflation were made at the College of Medicine of the University of Vermont. The electrophoresis was done in a portable electrophoresis apparatus (American Inst. Co.). All dimensions were: length, 7.2 cm.; cross section area, 0.75 cm.^{2} The serum was diluted 1:2.5 with barbital buffer and dialyzed against the buffer for 48 hours at 5 C.

The standard technique for udder insufflation was employed. Udder and teats were washed and dried. Teat orifices were swabbed with alcohol, and a commercially available antibiotic preparation was instilled into each quarter except the one from which colostrum was collected. The sterile cannula of the insufflation outfit was then inserted and each quarter was insufflated with filtered air until the udder was firm. Allowing no air to escape, each teat was securely closed by tying a 2-inch

Dr. Marshak is a general practitioner in Springfield, Vt.

This study was aided by a grant from the Lederle Laboratories Division of the American Cyanamid Company, Pearl River, N. Y.

The author expresses his appreciation to the many persons who have assisted in this study, particularly Dr. Allan M. Butler, Harvard Medical School; Miss G. Margaret Rourke and her staff, chemistry laboratory of the Massachusetts General Hospital; Drs. E. C. Gjessing, H. B. Pierce, and A. H. Schein, College of Medicine, University of Vermont; Drs. R. L. Burkhart and H. L. Easterbrooks, Lederle Laboratories; and Miss Margaret Hanscom, Springfield, Vt.

gauze strip around it; the gauze was removed after two hours.

RESULTS

Chemical data on serum and colostrum and hematocrit values are summarized (tables 1 and 2).

The blood calcium and inorganic phosphorus levels in cows with parturient paresis were found to be low. Clinical symptoms became evident when serum calcium fell below 8.0 mg./100 cc. of blood and became more marked as calcium levels continued to decline.

The characteristic changes in the calcium and inorganic phosphorus content of the serum and colostrum following udder insufflation (cow E-100) are graphically illustrated (chart 1). There was a rise in the serum with a comparable decline in the colostrum. Similarly, in cow J-93 (table 1), five and one-half hours after insufflation, the serum calcium increased from 3.3 to 6.1 mg./100 cc.; the serum inorganic phosphorus, from 4.3 to 7.5 mg./100 cc. At the same time, colostral calcium fell from 206.0 to 177.5 mg./100 cc. and colostral inorganic phosphorus from 104.0 to 89.0 mg./100 cc.

Preliminary studies of prepartum serum calcium levels in cows with a normal parturient course and in cows which developed parturient paresis were carried out at regular intervals in the prepartum period. Five cows of similar age and on similar rations were studied in each group. Serum calcium levels in both groups were in the lower to middle portion of the physiological range.[15,16] In the ten-day prepartum period, the average level of the group which developed parturient paresis was 8.0 mg./100 cc.; the average level of the normal group, 8.45 mg./100 cc. These values included levels on the day of parturition.

Electrophoretic patterns and distribution of plasma proteins were obtained from the plasma of 2 cows before and after insufflation. The results were the same for both

TABLE I—Chemical Data on Serum and Colostrum and Hematocrit Values Before and After Udder Insufflation

	Cow E-100 (J) (7 yr.)				Cow J-93 (J) (7 yr.)				Cow 594585 (H) (9 yr.)			Cow 683798 (J) (8 yr.)	
	Serum		Colostrum		Serum		Colostrum		Serum		Colostrum	Serum	
	Pre-insuf.	Post-insuf.	Pre-insuf.	Post-insuf.	Pre-insuf.	Post-insuf.	Pre-insuf.	Post-insuf.	Pre-insuf.	Post-insuf.	Pre-insuf.	Pre-insuf.	Post-insuf.
NPN mg./100 cc.	26.0	29.0 (5½)	64.0	60.0 (5½)	39.0	41.0 (10″) 39.0 (5½)	37.0	38.0 (5½)	20.0	20.0 (5½)	46.0	.....	.....
Total protein Gm./100 cc.	6.12	6.76 (5½)	12.85	10.86 (5½)	8.28	8.17 (10″) 7.44 (5½)	12.7	11.9 (5½)	6.57	7.43 (5½)	14.3	6.73	6.8 (2.5″) 6.5 (3)
Ca mg./100 cc.	4.4	7.2 (5½)	244.0	217.0 (5½)	3.3	4.3 (10″) 6.1 (5½)	206.0	177.5 (5½)	3.1	6.4 (5½)	200.0	2.35	2.5 (2.5″) 6.6 (3)
P mg./ 100 cc.	1.7	5.7 (5½)	128.0	114.0 (5½)	4.3	3.9 (10″) 7.5 (5½)	104.0	89.0 (5½)	.....	.....	.....	.....	.....
Alk. phosphatase units /100 cc.	6.9	8.7 (5½)	19.8	59.4 (5½)	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sugar mg./100 cc.	86.0	126.0 (5½)	1,336.0	1,116.0 (5½)	200.0	280.0 (10″) 182.0 (5½)	.....	.....	.....	.....	.....	.....	.....
Mg mEq./liter	2.4	2.8 (5½)	30.0	26.0 (5½)	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ketones μ M/cc.	0.06	0.07 (5½)	0.02	0.04 (5½)	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hematocrit (whole blood) (%)	38.0	42.0 (5½)	.....	.....	37.0	40.5 (10″) 39.0 (5½)	.....	.....	41.0	47.0 (1½) 45.5 (5½)	.....	39.0	39.0 (7″) 40.0 (10)

Postinsufflation levels of colostral constituents for cow 594585 were not obtained. Numerals in parentheses below the data figures indicate time of sampling in hours after insufflation unless marked by (″) which indicates time in minutes.

cows. The ascending and descending electrophoretic patterns of plasma proteins are shown (fig. 1; table 3) from a cow with parturient paresis before and after insufflation, respectively. This work indicates that there are no significant changes in the distribution of the plasma proteins as a result of udder insufflation. In other words, no qualitative alterations occurred in the plasma proteins.

Our data (tables 1, 2) indicate that serum protein levels in cows with parturient paresis are well within the normal range and are similar to values for healthy parturient cows of similar age. In a series of 31 determinations for serum total protein in a group of older, normal parturient cows, the average level was 6.43 Gm./100 cc. In a similar group of cows which developed parturient paresis, the average level was 6.6 Gm./100 cc.

Close inspection of all values for total protein and nonprotein nitrogen of serum and colostrum from cows with parturient paresis revealed an absence of significant changes following insufflation (tables 1, 2). No over-all correlation was apparent between the slight changes which did occur in serum and colostrum.

Sugar levels in the serum of parturient cows showed high values whether or not they developed parturient paresis. A total of 33 determinations for blood sugar of older cows in the prepartum period, which failed to develop parturient paresis, gave an average level of 88.12 mg./100 cc. as compared with 90.8 mg./100 cc. for a similar group which developed the disease. Sugar levels in serum rose rapidly after insufflation, particularly during the period soon after therapy (tables 1, 2; chart 2). A corresponding fall was evident in the colostrum. Thus, in cow E-100, serum sugar rose from 86.0 to 126.0 mg./100 cc. in five and one-half hours after insufflation, while colostral sugar fell from 1,336.0 to 1,116.0 mg./100 cc.

Determinations of serum and colostral magnesium were too few to warrant final evaluation (tables 1, 2). Although not highly significant, the trend would seem to indicate a slight rise in the serum and a corresponding fall in the colostrum following insufflation. Thus, in cow E-100, serum magnesium rose form 2.4 to 2.8 mEq. per liter five and one-half hours after therapy, while colostral magnesium declined from 30.0 to 26.0 mEq. per liter.

Studies still in progress indicate that there are no significant differences in magnesium levels of parturient cows whether or not they develop parturient paresis. The serum and colostral magnesium levels in the immediate prepartum and postpartum periods of 2 older parturient cows which failed to develop parturient paresis are shown (chart 3). The average level for

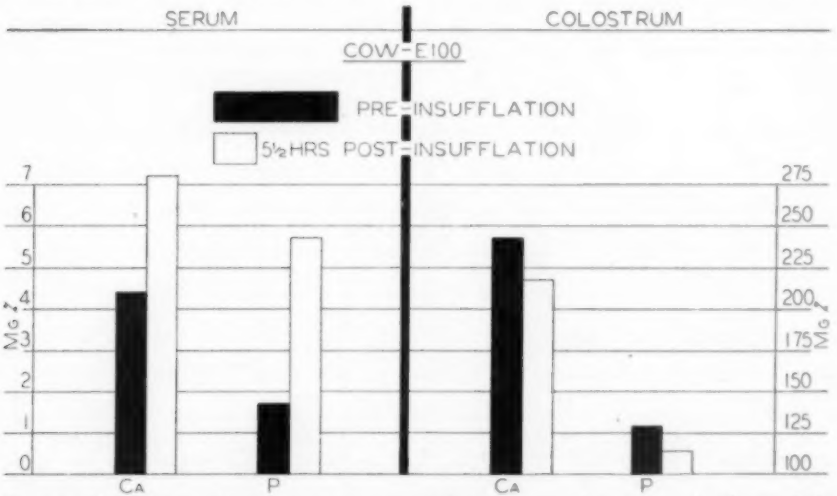

Chart 1—Characteristic changes in serum and colostral calcium and inorganic phosphorus which resulted from udder insufflation. Levels of these constituents rise in the serum and fall in the colostrum.

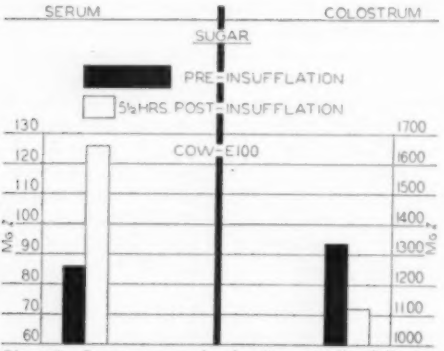

Chart 2—Serum sugar levels rise rapidly following udder insufflation, particularly in the early post-insufflation period. There is a corresponding fall in the colostrum.

both cows during this period was 2.55 mEq. per liter.

Our studies indicate that hematocrit values usually rise 1 to 5 per cent following insufflation but occasionally remain unchanged (tables 1, 2). Although not highly significant, the general rise in hematocrit was surprising since insufflation might reasonably be expected to hydrate the cow. This rise is possibly the result of a reflex mechanism.

Changes in the alkaline phosphatase content of serum and colostrum after insufflation were inconclusive (tables 1, 2). In general, there was a slight rise in the serum (chart 4). Thus, in cow E-100, a rise from 6.9 to 8.7 units/100 cc. occurred five and one-half hours after treatment.

Alteration in ketone values following insufflation were insignificant because total levels were so low (tables 1, 2). The tendency was for a slight rise in both serum and milk.

DISCUSSION

A close examination of these data would seem to support the view that the rapid and permanent therapeutic effects of udder insuffation in parturient paresis result from the return of certain colostral constituents, particularly calcium, directly to the circulation, and from a mechanical inhibition of colostral secretion which permits the homeostatic mechanisms of the cow to restore blood calcium to physiological levels.

The course of events may be outlined as follows: The mammary gland of cows susceptible to parturient paresis decalcifies the blood at a faster rate than calcium can be mobilized from the skeleton for the maintenance of normal levels. Consequently, blood calcium falls rapidly to below physiological levels and parturient paresis results. When the udder is insufflated with air, it causes a pressure which exceeds the secreting pressure of the gland acini. Some calcium, along with several other constituents, notably phosphorus, is forced back into the blood stream, resulting in rapid clinical improvement. Secretion of colostrum stops and decalcification of the blood by the mammary gland ceases. Calcium continues to be mobilized from the skeleton via the normal mechanisms of calcium homeostasis, including parathyroid activi-

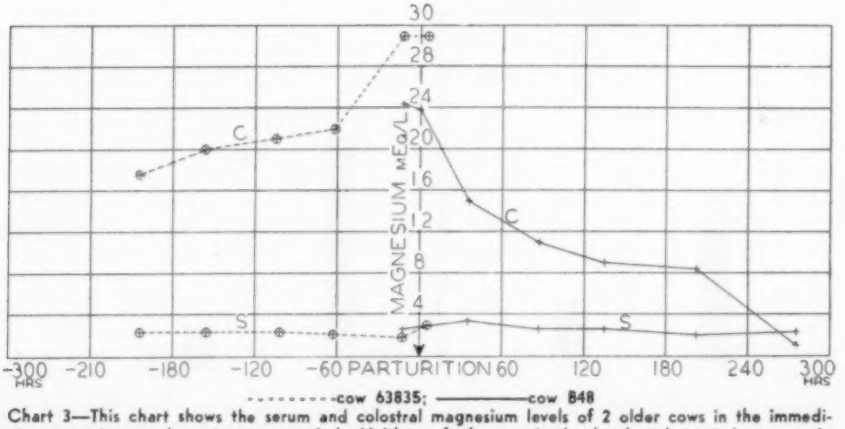

Chart 3—This chart shows the serum and colostral magnesium levels of 2 older cows in the immediate prepartum and postpartum period. Neither of these animals developed parturient paresis. S—serum; C—colostrum.

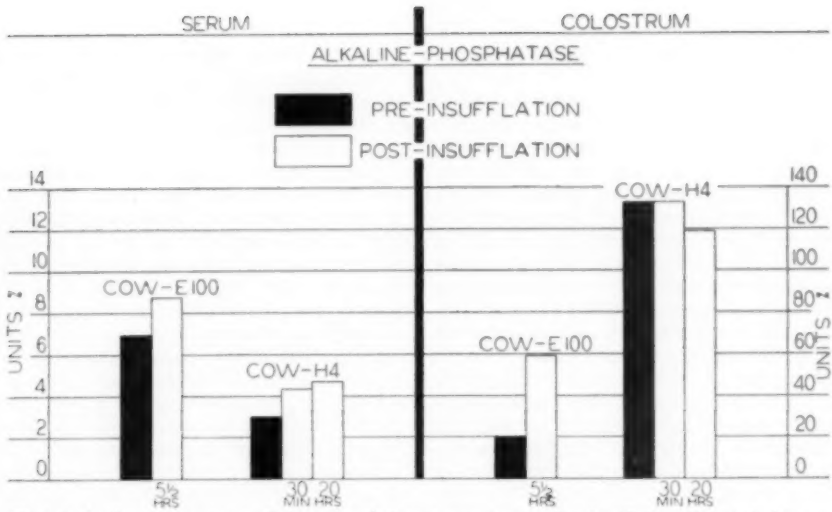

Chart 4—In these cows, serum alkaline phosphatase is seen to rise after insufflation. Colostral changes are inconclusive.

TABLE 2—Chemical Data on Serum and Colostrum and Hematocrit Values Before and After Udder Insufflation

	Cow H-4 (J) (6 yr.)				Cow H-78 (H) (5 yr.)				Cow 13F8899 (A) (6 yr.)			
	Serum		Colostrum		Serum		Colostrum		Serum		Colostrum	
	Pre-insuf.	Post-insuf.	Pre-insuf.	Post-insuf.	Pre-insuf.	Post-insuf.	Pre-insuf.	Post-insuf.	Pre-insuf.	Post-insuf.	Pre-insuf.	Post-insuf.
NPN mg./100 cc.	26.0	29.0 (30″) 34.0 (20)	66.0	55.0 (30″) 57.0 (20)	30.0	30.0 (5)	63.0	50.0 (5)	26.0	25.0 (1)	50.0	38.0 (1)
Total protein Gm./100 cc.	7.26	7.26 (30″) 7.22 (20)	13.8	14.2 (30″) 11.6 (20)	7.23	6.52 (5)	12.63	11.08 (5)	6.77	7.31 (1)	5.05	4.85 (1)
Ca mg./100 cc.	5.3	5.9 (30″) 9.1 (20)	229.0	232.0 (30″) 167.0 (20)	7.6	9.1 (5)	188.8	180.0 (5)	4.95	6.45 (1)	140.0	134.5 (1)
P mg./100 cc.	3.0	3.5 (30″) 6.7 (20)	117.0	117.0 (30″) 89.0 (20)	3.5	4.3 (5)	92.0	82.0 (5)	2.3	4.3 (1)	92.0	88.0 (1)
Alk. phosphatase units/100 cc.	3.0	4.3 (30″) 4.7 (20)	133.0	133.0 (30″) 119.0 (20)	3.9	4.9 (5)	74.0	78.0 (5)	2.1	1.9 (1)	4.0	4.0 (1)
Sugar mg./100 cc.	96.0	134.0 (30″) 107.0 (20)	1,290.0	1,210.0 (30″) 1,500.0 (20)	90.0	110.0 (5)	1,140.0	620.0 (5)	100.0	160.0 (1)	2,000.0	1,920.0 (1)
Mg mEq./liter	3.4	3.7 (30″) 2.4 (20)	29.5	31.0 (30″) 27.0 (20)	.....	.....	.....	.....	2.1	2.5 (1)	21.0	21.0 (1)
Ketones μ M/cc.	.....	0.33 (30″) 0.13 (20)	0.22	0.23 (30″) 0.14 (20)	0.09	0.10 (5)	0.11	0.28 (5)	0.27	0.34 (1)	0.12	0.16 (1)
Hematocrit (whole blood) (%)	42.0	42.0 (30″) 39.0 (20)	.....	.....	47.0	48.0 (5)	.....	.....	46.0	46.0 (1)	.....	.....

Numerals in parentheses below the data figures indicate time of sampling in hours after insufflation unless marked by (″) which indicates time in minutes.

ty,[17] and gradually returns to physiological levels.

Boda and Cole[18] suggest that a degree of parathyroid dysfunction exists in cows which develop parturient paresis and that the parathyroid glands are of primary etiological importance. The incidence of the disease is reported to be inversely proportional to the calcium-phosphorus ratio of the prepartum diet. They theorize that a low-calcium, high-phosphorus diet causes a compensatory hypertrophy of the parathyroid glands which are then able to maintain plasma calcium at normal levels.

We prefer to believe that there is no significant difference in the parathyroid activity of parturient cows of similar age on similar rations whether or not they develop parturient paresis. Indirect evidence to support this view is plentiful. The prolonged therapeutic effects of udder insufflation, as well as the fact that many animals with parturient paresis are permanently benefited by a single injection of calcium salts (a parathyroid-inhibiting influence), argues well for the integrity of the dual mechanism of calcium homeostasis. It would seem that in cows with parturient paresis the special circumstance of excessive and sudden colostral formation, with its concomitant decalcification of the blood, surpasses the ability of the average parathyroid gland to maintain physiological levels of plasma calcium.

TABLE 3—A Detailed Analysis of the Electrophoretic Patterns (Fig. 1), Giving Relative Distribution of the Bovine Plasma Proteins (Albumins and Alpha, Beta, and Gamma Globulins) Before and After Udder Insufflation in a Cow with Parturient Paresis. These Figures Prove that No Significant Changes Occur in the Plasma Proteins as a Result of Insufflation

	Total area	Distribution (%)			
		Albumin	Alpha globulin	Beta globulin	Gamma globulin
Ascending before insufflation A	517	50	10	22	17
Ascending after insufflation C	456	50	10	22	18
Descending before insufflation B	593	44	10	27	18
Descending after insufflation D	539	47	10	23	20

A direct correlation exists between calcium levels in the body fluids and the state of activity of the parathyroid glands.[17] When blood calcium declines, the parathyroid glands are stimulated to produce more hormone. Since our data indicate that blood calcium levels in the late prepartum period of normal cows and those with parturient paresis are both in the lower to middle portion of the physiological range, it seems doubtful that the cows with parturient paresis are significantly more hypoparathyroid. Even if stimulation of the parathyroid glands limits the hypocalcemia, the feeding of a low-calcium diet, when the fetus has increased the need for calcium and milk production will further increase this need, seems unphysiological.

McLean and Urist[17] have pointed out that mammals do not possess a "special" storage mechanism for calcium and phosphorus which functions to meet the special requirements of pregnancy and lactation. It is, therefore, the normal spongy bone of the skeleton which serves as the source of readily available mineral. Calcium and phosphorus in compact bone are much less readily transferred to the fluids of the body, either by solution of surface-bound ions or by resorption mediated by the parathyroid gland.[17] Hansard *et al.*,[19] in studies with radiocalcium, have found that, "as the animal becomes older, less of the bone calcium is available for exchange with blood calcium." These findings may help to account for the fact that the incidence of parturient paresis increases with age,[20] particularly when the rise in milk production which accompanies increasing age is considered.

No direct evidence is available to support the view[21] that protein and the undiffusible or protein-bound calcium is of etiological importance in parturient paresis. However, the special relationship of calcium and protein in blood and milk[22,23] provides a situation which merits study.

When total plasma calcium decreases or increases, the ratio of ionized to unionized calcium remains constant unless the concentration of the protein is altered.[17] The fact that colostrum is so high in protein has convinced some workers that plasma protein levels of heavy-producing parturient cows must be low. This view, as well as the belief that udder insufflation results in a return of protein and protein-bound calcium to the blood stream from the mam-

mary gland,[21] is not borne out by our data. The electrophoretic studies indicate that there are no significant qualitative alterations in the plasma proteins as a result of udder insufflation (table 3; fig. 1). Biochemical studies indicate that there are no significant quantitative changes in the plasma proteins as a result of insufflation (tables 1, 2). It is the diffusible and ionized fraction of the colostral calcium which is returned to the blood.

The rise in serum alkaline phosphatase, which usually follows insufflation in cows with parturient paresis (tables 1, 2; chart 4), suggests the need for further study. The recent discovery that osteoclasts have a high phosphatase content has led workers to believe that this enzyme may play a part in bone resorption.[17] High serum alkaline phosphatase levels are found in certain bone-destroying diseases (*i.e.*, osteomalacia), and the injection of parahormone is known to increase serum alkaline phosphatase activity.[23]

Magnesium levels in cows with parturient paresis are said to be high.[24] Some workers attach particular importance to the calcium-magnesium ratio[5,24] and relate this to symptomatology. When the calcium-magnesium quotient is lower than 5, an increased incidence of coma is said to result. Our data indicate that serum magnesium levels of parturient cows are high whether or not they develop parturient paresis (chart 3; tables 1, 2).

There is no evidence which would seem to implicate carbohydrates as an etiological factor in parturient paresis. The considerable increase in serum sugar levels following insufflation (tables 1, 2; chart 2) is

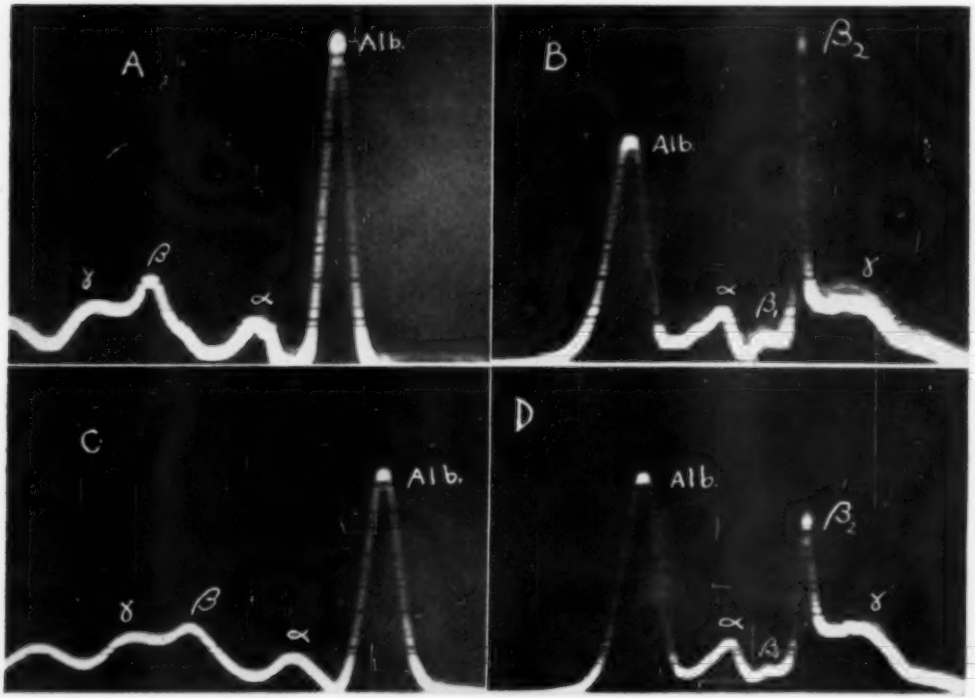

Fig. 1—Ascending and descending electrophoretic patterns of bovine plasma before and after udder insufflation: A and B, before insufflation; C and D, after insufflation. These patterns prove that no qualitative changes occur in the plasma proteins of cows with parturient paresis as a result of insufflation. Shown here are the albumins and the alpha, beta, and gamma globulins. In electrophoresis, the migration of the various protein fractions is due to the fact that they possess an electrical charge. It is a convenient way of separating and identifying the proteins.

due mainly to the resorption of lactose from the distended udder.[3,4] The high serum sugar levels of all cows at the termination of gestation is possibly the result of lactose resorption or of increased activity by the adrenal cortex responding to stress,[25-27] or of both.

CONCLUSION

Although it can not be said that we fully understand the pathogenesis of parturient paresis, there is much evidence which indicates that the primary cause of the metabolic disorder is not a deficiency of the mineral stores of the cow, but rather the inability of the organism's relatively normal homeostatic mechanisms to cope with the sudden and excessive demands for mineral incident to colostrum and milk production at parturition.

While the intravenous infusion of calcium salts is widely regarded as the treatment of choice in uncomplicated parturient paresis, udder insufflation is, in certain respects, superior therapy. The combined use of sterile technique and antibiotics decreases to negligible proportions the hazard of causing mastitis. The writer has insufflated 440 udders without a single case of mastitis resulting. Relapses, a major problem after calcium salt therapy, are exceedingly rare. It has been our experience that the only cows with uncomplicated parturient paresis which relapse following udder insufflation are those animals which leak copious quantities of colostrum after the gauze bands are removed from the teats. Cows which relapse or respond poorly to injections of calcium salts recover speedily and permanently after insufflation. This is perhaps the area of its greatest usefulness.

Clinical improvement was evident within 15 minutes following insufflation, even in cows which were comatose and near death. Most animals rose and began eating within two or three hours. If the cow was stricken before calving, parturition then proceeded normally.

A study of the phenomenon of insufflation provides numerous clues which aid in understanding the events and etiological factors of the metabolic disturbance. It would seem that this mode of therapy deserves more general use.

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Biochemistry of Parturient Paresis

The occurrence and severity of parturient paresis were related to the degree of decrease in serum calcium and total phosphates but not to serum magnesium and plasma lipid phosphate.

In 93 affected cows, the response to calcium therapy or udder inflation was more satisfactory when symptoms appeared an average of 23 hours after calving than when they appeared an average of 6.5 hours after calving. Ten hours after calcium therapy, serum calcium levels were similar in the two groups but the plasma phosphate levels showed a more sustained rise in the satisfactory group than in the unsatisfactory group. All blood constituents showed a sustained rise after udder inflation.—*Vet. Bull., Feb., 1956.*

Eosinophilic Myositis in Dogs

Eosinophilic myositis, also called "atrophic myositis" and "trismus," in which the muscles of mastication are affected, has been recognized as a disease entity of dogs since 1940. It has been reported from many foreign countries as well as from the United States and, although it affects many breeds, including Miniature Poodles, Saint Bernards, Boston Terriers, and the Japanese Chin, it has been reported most frequently in the German Shepherd.

The affected muscles show a bilateral enlargement and, in the later stages, the jaws can not be forced open (pseudotrismus). Most workers report that this condition is not painful. Because of the swelling of the temporal muscles, causing an increased pressure on the retrobulbar fat, exophthalmus may occur. The eyelids, also being under pressure, have a tendency to remain open, resulting in a dry and ulcerated cornea. Tonsillitis and mandibular lymphadenitis have been reported in most cases. In 2 exceptional cases reported, the hindlegs of 1 dog and the forelegs of another were involved.

The acute phase of the disease lasts two to three weeks and is followed by recurrent attacks at progressively shorter intervals.

A positive diagnosis is based on an increased eosinophil count—from the normal 10 per cent to 13 to 63 per cent—in the peripheral blood of the animal.

Necropsy reports indicate that the disease may be divided into three stages: (1) First, the musculature shows grayish red streaks with scattered yellowish areas and hemorrhage. There is an interstitial infiltration of mature eosinophils in the affected muscle, tonsillitis, and mandibular lymphadenitis. (2) In the second phase, there is an infiltration of eosinophils and mononuclear phagocytes in the muscles. The macrophages in hemorrhagic areas are loaded with hemosiderin and some of the musculature shows a nuclear proliferation indicating a muscular regeneration. (3) In the final phase, there is a great infiltration of lymphocytes, plasma cells, and a few eosinophils and histiocytes. There is also an increase of fibrous tissue between the normal muscle fibers, and the jaws can not be forced open.

The etiology of the disease is unknown. The possibilities considered are parasites, allergies, trauma, and inflammation of the mandibular nerve. Treatment has included massage, heat, local irrigation, antihistaminic medication, short-wave electrotherapy, and cortisone therapy. In 1 animal treated with cortisone, there was a spontaneous regression of symptoms, but the efficacy of this treatment is in doubt.

This report (*Vet. Rec.*, Dec. 31, 1955) describes 4 cases seen by the author.—J. H. McCLURE

The thickness of the back fat can be estimated by placing a gadget, called an electronic lean meter, directly on the back of the live pig.—*Progressive Farmer, March, 1956.*

A New Tuberculosis Vaccine

An immunity in mice equal to that produced with BCG was achieved at Northwestern University by grinding tubercle bacilli and centrifuging them at a high speed to separate the fractions. Some of these nonliving particle fractions protected 60 to 70 per cent of the mice against infections which killed all of the controls.—*Science, March 9, 1956.*

Portable Equipment for General Veterinary Practice

E. W. PORTER, D.V.M.

Reynoldsburg, Ohio

IN LINE with the noteworthy advances in the science of veterinary medicine, the general practitioner has a responsibility to equip himself so he can put into practical service the new findings of field and laboratory research. This requires extensive equipment which must be kept in usable condition; also some system of classification must be followed in order that each item will be readily available when needed. The preferences of veterinary practitioners for types of portable equipment and their methods of carrying it vary.

For many years, the writer has been interested in methods of maintaining good equipment and keeping it in the best possible condition. The practice of veterinary medicine is at some times quite rugged. Many calls take much more time and effort than expected and, due to this and emergency cases which must be taken care of, a regular schedule can not be followed. This leads to an increase in work tempo with a tendency to cut corners. We sometimes have to rush from one case to another without being able to carefully clean up after each one. This may eventually result in careless habits and in equipment being neglected; practitioners know the final results of that only too well. The best time to clean up is immediately following completion of each case. If this is done and each item is returned to its proper place, the time involved is less than when the cleaning is delayed. Not only is time saved but many unpleasant experiences may be prevented.

Dr. Porter is a general practitioner in Reynoldsburg, Ohio.

Fig. 1—Trunk of automobile with equipment in position.

Fig. 2—Cabinet mounted in back of car with rear seat removed.

Fig. 3—Trunk carrier pulled out to show the availability of equipment.

Fig. 4—Grips carried in trunk for different types of treatment.

ONE MAN'S WAY OF DOING THINGS

In any arrangement, the paramount consideration is a proper vehicle for transportation. This today is usually an automobile. I know of no automobile, as it leaves the factory, which is arranged to contain the specialized equipment which is required; therefore, some changes must be made. At the present time we are using a two-door club sedan. We use a heavier car to avoid trouble due to the heavy load and the rugged driving which must be done. We are using a 1955 Packard "400 hardtop" which, with all the bothersome spring troubles eliminated, has ample room.

The rear view with the lid raised shows (fig. 1) the large trunk space (which is so important) with the load in position.

In changing the car, so it can best serve its specific purposes, the rear seat is removed and placed in storage with moth protection until trade-in time when it will be replaced in new condition. In this space is installed a sliding carrier which in this car is 4 by 36 by 72 inches. This is mounted on a track made of angle iron, one part of which is welded to the floor of the car and the other is screwed fast to the underside of the carrier. The floor is covered with a corrugated rubber mat which is cemented down and which will largely prevent shifting of the load. The carrier, made of ½-inch plywood, is strong and foolproof in operation. The cabinets placed on either side of the carrier, partly under the fenders, provide a large space for heavy items such as lariats, halters, leaders, rope hoists, castrating clamps, hoof instruments, coveralls, rubbers, boots, et cetera. When the rear seat is removed, it opens a space to the back of the front seat through which the carrier slides. Room must be left to bolt the spare tire just back of the seat but the rest of the space is boxed in with plywood. A cabinet with four compartments (fig. 2)

Fig. 5—Work tray which is shown in figure 1 covered with a towel.

Fig. 6—"Hypodermic" grip which contains equipment for treatments requiring hypodermic injections.

is then mounted on top of the boxed-in section. This cabinet, which is painted to match the top of the car, holds a large supply of the equipment which must always be readily available. This consists of medicine in powder, bolet, and tablet form; testing, tattoo, and tagging equipment; record forms; and many other items.

When the carrier is pulled back (fig. 3), it makes all grips available without disturbing any other items. On the carrier are seven grips, two of which are mostly mementos but which still are of some use. Also two boxes of overflow supplies, 1 gal. of mineral oil, and a 3-gal. stainless steel bucket. The item covered with a heavy towel is a collapsible monel metalwork tray which is readily available. The main grips (fig. 4) were made of ¾-inch plywood by an expert cabinet maker. They are furnished with strong hinges, handles, clasps, stainless steel edges, metal corner bumpers, and are varnished outside and enameled inside.

The small black grip in the left foreground is the old Nancy Hanks grip, named after the old trotting mare which held three world's records in 1892. This was purchased 48 years ago and proudly carried back and forth to classes with nothing in it but clear if not pure Columbus (Ohio) air. It will have its corner in the carrier as long as I am able to put it there. The large grip on the left, with back presented, shows hinges with six small bolts in each. Directly across is a light-colored grip with clasps; the lock is unnecessary. The center grip is open to show the tray in place.

Every item which is to be carried is classified according to the service it is supposed to render and the group of items for each purpose, such as for parenteral therapy, are placed in one grip (or case). Every item which will be used for that purpose will be in this grip, except a few more commonly used items which are carried in the "work" (back seat) tray for convenience. Thus, the contents of each grip are for a separate purpose and the practitioner knows where to look for any item. Furthermore, if for any reason it becomes necessary to walk or to change vehicles to get to a patient in a place not accessible by car, the proper grip or grips can be taken without shifting the contents.

The handy work tray which is carried, covered with a towel on the carrier, contains (fig. 5) items frequently used. It includes a stainless steel pan, knives wrapped in gauze, a thermometer, pencil, forceps, scissors, teat instruments in antiseptic, alcohol, syringes, antihistamine, materials for treating mastitis, sterile distilled water, catgut, ointments, needles in alcohol, and antibiotics. The "hypodermic" grip, shown with the fractional-width tray set in the lid (fig. 6), contains all the supplies and remedies used in hypodermic treatment. The contents are readily identified.

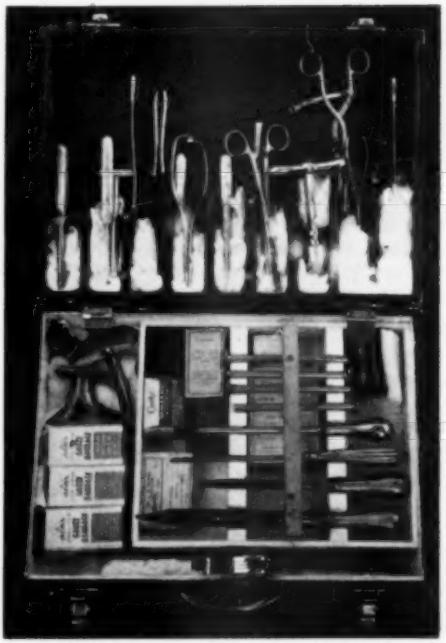

Fig. 7—Instrument grip with plastic partitions through which instruments are easily seen.

The instrument grip (fig. 7) opens in the middle and has a clear plastic partition through which the instruments are easily seen. The other similar grip contains a stomach pump and two sizes of stomach tubes. The old tablet grip (right front, fig. 4) is the type which was popular in the twenties when there was a move to replace tincture and fluid extract treatment with tablets. Drugs were much cheaper in this form and tablets still have their place in treatment. Of the other two large grips (back row, fig. 4), one is for obstetrical and sterility instruments and

supplies and the other is for miscellaneous instruments, extra towels, and supplies.

This arrangement may seem to some to be quite elaborate, expensive, and perhaps to some extent unnecessary. However, the practitioner is intrusted with the prevention of disease and the care and treatment of the sick and anything he can do to improve that service and to conserve time is worthwhile. He is in the front line in serving the public and in maintaining the reputation of the profession. In his hands must be the finest equipment in the finest condition if he is to do his part properly.

[The surgical kit (fig. 8) is so practical, sanitary, and commendable that it merits reprinting from the 1955 AVMA "Proceedings Book" (page 381). The idea is not new but here it is particularly well developed.—ED.]

Aleutian Disease in Mink

A disease marked by weight loss without a decrease in food consumption, by extreme thirst, and sometimes by oral hemorrhage, anemia, and delayed blood coagulation eventually terminating in death, is usually confined to Aleutian mutant mink. Common lesions include gingivitis with ulcers, followed by decay and loosening of the teeth, and blackened ulcerated tongues. The most significant lesion is nephritis. In the early stages, the kidneys are swollen and pale, with small hemorrhages; in the late stages, they are shrunken and pitted. The cause is undetermined and no therapy has been of benefit. Out-crossing with other strains of mink often seems to control the diseases. —*G. R. Hartsough, D.V.M., and J. R. Gorham, D.V.M., Nat. Fur News, March, 1956.*

—*1955 AVMA Proceedings Book*

Fig. 8—A surgical kit (a large wooden suitcase) which Dr. R. H. Bradbury developed for carrying instruments into the field. The inset shows the case hung on the wall of a barn with photoflood lamps placed advantageously.

Genesis of Veterinary Education in the United States

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THE VETERINARY PROFESSION, like every profession in every country, is naturally inclined to glorify its past. We praise our champions and justly emphasize the great contributions to society that veterinary medicine has made. Much has been written about the achievements of Theobald Smith and F. L. Kilbourne, James Law, D. E. Salmon, and of numerous others of similar stature. However, there is a tendency to minimize shortcomings. Early veterinary education, like early medical education, was generally considered to be an inferior calling by society. It is not my purpose to praise or condemn, but to cite conditions and developments.

A discussion on this topic must ignore, for the sake of brevity, many important areas. Rather than compile a colorless list of dates, names, and places, only a small segment of veterinary education is to be discussed: the eras just before and after the abortive birth of formal veterinary schools.

VETERINARY MEDICINE BEFORE ESTABLISHMENT OF SCHOOLS

Long before the first veterinary school was established in the United States, there was evidence of drugstore type of veterinary diagnosis and therapeutics (an ignominious practice nurtured by some in even this "enlightened age"). According to Gordon (1945),[5] the *New York Gazette* of Aug. 22, 1765, printed the following advertisement:

> Notice to the Publick
>
> That Augustus Stewart, of New Jersey has prepared a HORSE POWDER, which for its qualities and operations exceeds any thing hitherto contrived for the benefit of that animal. In all disorders to which those creatures are liable, it gives quick relief, purifies the blood, makes the beast more than ordinary lively, brisk, and strong, and occasions him to thrive in fatness, on almost half the provisions he in common devours. It is a great preservative against disorders of all kinds, giving only one common table spoon full of it once a week. . . . This powder is a total poison for the botts, and carries all off by evacuation.

Fanciful claims were not the exclusive property of animal healers. In the *Pennsylvania Gazette* (June 18, 1767), Thomas Wire advertised that he had established an office, "where he proposes to practice all Branches of Physic and Surgery. He undertakes particularly to cure, with small Expense and Pain to the Patient, Cancers and Wens, without cutting them, the King's Evil, Venereal Disorders, without Sallivation; Rupture, Strangury and Stone; and as he has had great Experience and Success in all the above Diseases, he hopes, by the divine Blessing, to be able to give Relief to any distressed Persons, afflicted with them, that shall apply to him."

Perhaps medicine has deteriorated rather than advanced during the last century. Even with "wonder drugs," medicine and surgery today can not compete with the above accomplishments.

According to Liautard (1877),[11] the first graduate veterinarian in this country was John Rose in 1827, a graduate of a school in Prussia, who established a practice in New York City. He was followed by C. C. Grice, R. H. Curtis, A. Lockhart, R. H. Budd, and C. Pilgrim, all from London, England.

In Massachusetts, a Mr. Harrington was considered to be the "leading man in Boston" about 1827. Besides being a blacksmith, he took charge of all sick animals. His assistant, John Davis, was the surgeon, and "many a Sunday morning found him fleams and bleeding stick in hand busy practicing venesection."

In 1857, R. Jennings[9] discussed the subject of empiricism as it then existed:

> Quackery seems to be the order of the day. This assertion needs no proof beyond the natural senses of every man, woman, or child. In whatever section of the country the Veterinarian may pitch his tent, he is surrounded by hosts of empirical practitioners. Smiths generally pretend to be horse doctors. . . My remarks apply to the illiterate, whose knowledge of medicinal agents are only superficial. . . Hit or miss, kill or cure, all the same. It is not infrequently the case that harmless remedies produce death, from ignorance or carelessness in the manner of administering them.

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The "dark ages" of veterinary medicine, prior to the beginnings of authentic veterinary schools, are nicely documented by Merillat and Campbell (1935).[12] Unlike early medicine in the United States, veterinary medicine did not have to live down repeated episodes of resurrectionism (body snatching) with resultant riots and public disapproval of practical anatomy. However, it was not easy to change opinions of veterinary medicine formed in the minds of the populace by practitioners who, according to Campbell (1934),[3] were almost as ignorant as the animals they treated and were, "a thoroughly disreputable lot whose equipment for practice consisted of a collection of 'receipts'—infallible cures—one for each ailment, gross ignorance and monstrous effrontery."

Earliest Veterinary Schools in the United States

Veterinary education was first conducted by private tutelage. Practitioners trained understudies. Each preceptor, skilled or not, produced after his kind.

The earliest veterinary schools were of the proprietary type, located in livery stables, or like structures. They were chartered as businesses and were supported completely by student fees (Hagan, 1951).[6]

There is considerable confusion regarding the exact location and date of origin of the first veterinary school in the United States. Obscure records and lack of distinction between the date of charter and the date of physical establishment of a school make positive determination difficult.

This country's first, legally organized veterinary schools were formed between 1850 and 1860 in Boston, Philadelphia, and New York City. According to Bierer (1940),[2] the veterinary school at Philadelphia received its charter in 1852, but no buildings were ready until 1858. Merillat and Campbell (1935)[12] state that Robert Jennings of Philadelphia, in 1850, tried to establish a veterinary college, "and in 1852, obtained a charter for the 'Veterinary College of Philadelphia.' In 1853, he organized the faculty, on which John Scott was the only graduate veterinarian. Disputes brought this project to a close."

In May, 1856, R. Jennings[8] wrote in the *American Veterinary Journal*:

> . . . New York, has been trying for some time, to establish a Veterinary College. Boston is ahead of her, and I presume, will keep so. The veterinarians, also, have been up and doing for several years back in Philadelphia, in the praiseworthy object of elevating this important branch of medical science to its proper position; how far they have succeeded, I leave for others to decide. In the year 1852, the Legislature of Pennsylvania granted a charter for a Veterinary College, to be located in Philadelphia, the greatest emporium of medical science, on this continent, which, however, from some cause, (I do not wish to charge my brother veterinarians, with want of energy,) but I know of no other reason, why Philadelphia, at this time, should not boast of her Veterinary College, be it, however, from whatever cause it may, it still remains a dead letter. They have, however, been more energetic in the formation of an Association, bearing the title of the American Veterinary Association, instituted, May 7th, 1854.

In the "Proceedings of the Veterinary Association of Philadelphia" (1858),[13] it is stated:

> . . . gentlemen of science and skill interchanged thoughts on the ultimate purposes of the association, which is the establishment in this city of a Veterinary College, for which a charter was obtained some years ago, and which the friends of the measure have only awaited a favorable opportunity to bring before the public.

The same "Proceedings" contains the comment that a representative of the *Philadelphia Inquirer* ". . . viewed with deep interest the efforts of the association to establish a Veterinary College in Philadelphia, which being the natural center of the United States, would be the best position for such an institution as contemplated."

Liautard (1877)[11] stated that Dr. G. H. Dadd, in 1855, obtained from the Massachusetts legislature a charter, "establishing the first Veterinary College in America under the name of the Boston Veterinary Institute." This had a medical staff of four men: G. H. Dadd, C. M. Wood, R. Wood, and A. S. Copeman.

Merillat and Campbell (1935)[12] reported that: "Dr. D. D. Slade, a physician of Boston, obtained a charter for "The Boston Veterinary Institute" in 1855 and organized a faculty with himself as president and Chas. W. Wood, Geo. H. Dadd and A. S. Copeman as professors. The school met with small success and closed after four sessions. The list of its graduates is unknown but of them four became president of the United States Veterinary Medical Association. . . . In some way, the impression has come about that Dadd established and conducted the Boston Veterinary In-

stitute. He tells us that he had nothing to do with its management. Wood was, apparently, the real power behind it."

However, in the December, 1858, issue of the *American Veterinary Review* there is an advertisement[1] for: "School of Veterinary Medicine and Surgery, Established in Boston in 1849, By George H. Dadd, M.D., V.S."

The advertisement then goes on to solicit as pupils, "any number of persons desirous of acquiring knowledge in the Principles and Practice of Veterinary Science." There were facilities for, "dissection, demonstration and infirmary practice," and the pupils could join a class, "at any season of the year." The regulations stated that before a student could take the final examination, he must have attended two full sessions of four months each. He could also attend lectures on chemistry and pathological anatomy in the Medical Department of Harvard University. However, the regulations allowed a person to graduate in a total of four months if he could meet the following requirements:

> Any person who may have practiced Veterinary Medicine for a period, of not less than ten years, and can produce documentary evidence of the fact, accompanied by testimonials of good moral character, he can after studying one session, present himself for examination; failing to satisfy the Board of Examiners of his proficiency, he must then qualify himself in whatever branch he appears deficient and then he is entitled to a re-examination.

Dr. R. S. Huidekoper (founder of the School of Veterinary Medicine at the University of Pennsylvania) in his introductory address at the opening of his school in 1884, said that in 1855, "Dadd and several associates formed the first veterinary school in the country which, however, soon disappeared."

During the 1850's, many men clamored for improved conditions in veterinary medical education. Dr. G. H. Dadd,[4] in a communication to the *American Veterinary Journal* (Nov., 1856) asked:

> Where are our veterinary universities? and who answers, Where? Are the Americans blessed with the presence of a host of veterinary surgeons? No! They are few and far between. We are rich in means for the endowment of such institutions, but as yet there has been no practical application of the same. There are, however, three incorporated veterinary colleges in this country, not one of which has ever gone into operation.

According to some, neither the Veterinary College of Philadelphia nor the Boston Veterinary Institute had any graduates. However, Parry (1859)[15] described activities in the dissecting room of the "Boston Veterinary School," indicating at least the presence of students.

Bierer (1940)[2] writes of the Philadelphia school, "In 1859, two students were secured, one of them being a graduate of the Boston Veterinary Institute." Bierer also states: "The Boston Veterinary Institute was incorporated during May 1855 . . . . By December, 1857, having been in operation just two and one-half years, the school had but six graduates."

There is, however, a lack of unanimous agreement as to whether the graduates of the Boston Veterinary Institute were actually "graduates" or had merely attended parts of sessions.

The third veterinary school established during the 1850's was the New York College of Veterinary Surgeons. Chartered in 1857 (1852, according to Hagan[6]), a building was erected in New York City on West 23rd St., near Sixth Ave. Liautard (1877) wrote: ". . . when the time came for the lectures, the faculty failed in its duties, and shortly afterwards the college was closed up, and the whole place used for a livery stable, which was destroyed in 1865 or 66 by fire."

The school was reorganized and started again at 205 Lexington Ave. Student enrollment increased to 18 in 1873, but difficulties arose in the board of trustees, giving rise to legal controversy. Lectures were no longer delivered, the hospital room had to close its doors, and the property was sold to satisfy indebtedness. This occurred after the 1874-1875 session.

According to Huidekoper (1884)[7]:

> The New York College of Veterinary Surgeons was chartered in 1857, and up to 1875 led a feeble existence, during which it issued some eighteen diplomas. . . . In 1875, the American Veterinary College was formed in New York from the New York College of Veterinary Surgeons, with Professor Liautard, a French graduate, at its head. This school has steadily increased in value and number of students. It was the first medical school in the State of New York to require a matriculation examination. It has issued diplomas to 133 of its students.

The 1954 AVMA "Directory," however, states that the New York College of Veterinary Surgeons existed from 1857 until

1899, with 291 graduates. The American Veterinary College, on the other hand, is said to have existed from 1875 until 1898, with 628 graduates. In addition, the *American Veterinary Review* of October, 1895, lists the American Veterinary College as being located at 139-141 West 54th St., and the New York College of Veterinary Surgeons as being located at 154 East 57th St. Apparently, the latter school did not fail in 1875; the American Veterinary College being established as a separate venture.

Although there is some question as to the number of "graduates" from the Boston Veterinary Institute, there is no question about the fact that the New York College of Veterinary Surgeons was the first to produce a substantial number of graduates.

Some of the early crusaders visualized a bright future for the profession, in spite of the low status of the veterinarian and the abundance of quacks in the 1850's. Dr. R. Jennings (1857)[10] wrote:

> The course of veterinary science is onward and upward; its rapid advancement dazzles the eyes of all the old fogy veterinarians. The empiric begins to quake with fear. Men of education, enterprise and refinement are filling up our ranks, and are destined to rescue it from the hands of the farrier, as did scientific men rescue human medical science from the hands of barber surgeons; in fact many of the minor operations in human surgery are performed at present by barbers, such as cupping, bleeding, extracting teeth, etc. From this we see that our own task is by no means a hopeless one.

CONCLUSIONS

Although there is much confusion regarding the dates and places formal veterinary education began in the United States, and even "eyewitness" accounts often contradict each other, it is apparent that the Veterinary College of Philadelphia was the first to receive a state charter (1852). However, the Boston Veterinary Institute was the first organized school to hold classes. It was chartered in 1855, despite an early advertisement listing its inception as 1849. The New York College of Veterinary Surgeons (1857) was the first school of reasonably lasting status and the first to graduate a large number of students.

As in early medical education, the pioneer veterinary schools were characterized by faculties dependent upon student fees for existence, with no balance in the way of personally disinterested trustees. There was a distinct tendency to ignore standards of preparatory education and to be lax with requirements for graduation. Lack of state regulations permitted quacks to over-run the profession. Maintaining standards was difficult; elevating them was a Herculean task.

Early veterinary education, despite its lack of unity and flagrant deficiencies, produced many brilliant educators, research workers, and practitioners. It was the genesis for the high standards and accomplishments of the veterinary profession as it exists today.

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Fever in cows, as a result of operations, was accompanied by a fall in milk yield, an increase in fat content, and a decrease in solids other than fat.—*Vet. Bull., Feb., 1956.*

Surgery and Obstetrics
and Problems of Breeding

Epizootic Bovine Abortion Characterized by Fetal Hepatopathy

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ABORTION in cattle has been a serious and almost continuous problem of the California cattle raiser. Traum and Hart[1] in 1923 reported on the incidence and importance of brucellosis and vibriosis in California cattle and discussed abortion without demonstrable etiological factors. Cameron[2] investigated genital diseases of unknown cause in herds free of brucellosis and reported the presence of trichomoniasis in many of these herds. DeLay and Rucker[3] in 1951 reported on enzootics of abortion of unknown cause in cattle in California definitely not due to brucellosis, vibriosis, or trichomoniasis. Howarth,[4] in a report on leptospirosis in California, cited abortion as a major manifestation of that disease.

Since 1950, bovine abortion has been a major diagnostic problem for the various veterinary laboratories in the state. It is the purpose of this paper to present data concerning the magnitude and extent of bovine abortions, and the procedures used in differential diagnosis. Also to describe a type of abortion of which the cause is not known.

In the five-year period of 1950-1954, 188 aborted bovine fetuses were presented to the pathology section of the School of Veterinary Medicine for diagnosis. In 11 of these fetuses, a definite diagnosis was established by isolating Brucella or *Vibrio fetus* organisms. The remaining 177 could be roughly divided into two groups. The first category included those fetuses not exhibiting significant pathological changes. In a majority of these, either prenatal decomposition was well advanced or the fetus was at the fourth or fifth month of gestation. The second category comprised 44 fetuses at the sixth to eighth month of gestation in which characteristic lesions of subcutaneous edema, ascites, generalized hemorrhage, and hepatopathy were observed. This latter group is regarded as a separate pathological and etiological entity, and is designated as epizootic bovine abortion.

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Acknowledgment is due to Dr. Charles E. Cornelius for performing the carotene, vitamin A, and mineral analyses of bovine blood in this study.

FIELD OBSERVATIONS

Clinically, epizootic abortion was characterized by the sudden onset of abortion occurring simultaneously in many herds throughout an area. Fetuses at the sixth to eighth months of gestation were aborted, with losses in some herds reaching 30 to 40 per cent. Once established in a herd, the disease occurred annually with losses confined to first-calf heifers except during the first year when all ages could be affected. An immunity appeared to develop since animals did not abort a second time. A definite seasonal incidence in the period of July through October was noticed even in herds where breeding occurred during all seasons.

Two beef herds, designated E and W, were selected for study on the basis of fetal pathology and frequency of abortion.

Herd E consisted of 150 mature Hereford cows which were wintered in the foothills adjacent to the Sacramento Valley and spent the five summer months in the San Joaquin Valley on permanent pasture. The first abortions in this herd occurred in October, 1954, when 10 fetuses at the eighth month of gestation were aborted. Two of these were examined and 1 presented the typical pathological picture mentioned earlier (fetus 1912, table 1). During the period of October through December, 1954, 10 cows had normal calves and the others calved normally during the first quarter of 1955. Thus, of 20 cows bred two or three months earlier than the rest of the herd, 10 aborted. It should be noted that 3 cows in this herd died of anaplasmosis during October, 1954, and that serological tests failed to show evidence of Brucella or Leptospira infection.

Herd W was a large commercial Hereford herd including about 3,000 animals of breeding age with headquarters in the low foothills bordering the San Joaquin

Valley. During the 1952 and 1953 calving seasons, 200 of 500 and 200 of 700 first-calf heifers, respectively, aborted at five to eight months of gestation. During both of these years, the mature cows in the herd calved normally. During the 1954 calving season, 2,000 mature cows, including animals that had aborted previously, calved normally during the period from July 1 through November 1.

TABLE I—Common Lesions Observed in 8 Aborted Fetuses

Gross Lesions	Fetus (No.)							
	1342	1344	1348	1351	1455	1505	1506	1912
Subcutaneous edema	+	+	−	+	−	+	+	+
Ascites	+	+	−	+	−	−	+	+
Hepatopathy	+	+	+	+	+	+	+	+
Splenomegaly	+	−	−	−	−	+	+	−
Serosal petechiae	+	−	−	−	−	−	+	+
Respiratory tract petechiae	+	−	−	+	−	−	+	+
Lymph node edema	+	+	−	−	−	−	+	+
Skeletal muscle hemorrhages	+	−	−	−	−	−	+	−

Note: Positive signs indicate that lesions were present; negative signs that lesions were absent.

About 800 virgin heifers were kept on the same ranch but in a different field. Bulls accidently gained access to this field and some of the 800 heifers were bred early. On Feb. 10, 1954, bulls were added for what was considered to be the normal breeding process. By July, 1954, 240 heifers had calved normally as a result of the earlier accidental breeding. Starting on July 15, abortion of calves at the sixth month of gestation began and continued at an alarming rate until October. Of the 560 heifers which were bred during the normal breeding process, 350 aborted. The seasonal distribution of abortion in this group might indicate transmission by the second group of bulls or by unknown disease vectors present during the summer and fall months of the year. Since these heifers were maintained on dry stubble pastures during the precalving season, it was also possible that avitaminosis A or a mineral imbalance could have occurred. Therefore, blood samples were collected from 15 animals for the determination of carotene, vitamin A, calcium, phosphorus, and magnesium levels. Samples had been collected one month before abortion started and again just preceeding the abortion storm. It was considered that the values obtained were within the normal ranges for Hereford cows.

EXPERIMENTAL RESULTS

In August, 1954, 23 first-calf heifers at six to seven months' gestation, from herd W, were brought to the University for observation and study. On the day following arrival, all cows were checked for stage of pregnancy and blood samples were taken. Five cows aborted during the five days following arrival (fetuses 1348, 1344, 1351, 1366, and 1455).

Starting three weeks after observation of this group was initiated, twice daily body temperature readings were taken for the heifers that had not aborted. Cow 1530 had a febrile period of four days with a peak temperature of 107 F. Blood collected at this time was cultured but was found to be grossly contaminated. This animal aborted 22 days following the febrile period (fetus 1627). Cow 1462 had a febrile period of three days with a peak temperature of 104 F. Blood collected at this time was cultured and *Trypanosoma theileri* was isolated. This animal aborted six days following the febrile period (fetus 1506). Cow 1461 showed a febrile reaction with a peak temperature of 106 F. Blood cultured at the height of the fever yielded a Micrococcus. This cow calved normally one month later. One additional cow aborted six days following the beginning of temperature recording (fetus 1505), but this period of observation was too short to correlate the febrile reaction with abortion. One calf (1700) was born alive but died the next day. On necropsy, the lungs were well inflated but no milk or colostrum was present in the stomach. A Streptococcus was isolated from the abomasal contents and spleen.

Two gravid cows were killed before signs of parturition or abortion were evident. No pathological alterations were found in either cow or in their fetuses. Bacteriological examination of the tissues of 1 of these fetuses was negative, the other was not cultured.

Of the 23 animals received for study, 12 calved normally, 8 aborted, 1 gave birth to a calf that died within 24 hours, and 2 were killed for necropsy. Blood samples collected at the beginning and termination of the observation period showed no rise in antibody levels to Brucella or Leptospira antigens.

PATHOLOGICAL FINDINGS

Materials and Methods.—Studies were made of the pathological changes of 8 fetuses from the two beef herds (E and W). These showed minimal postmortem autolysis. Necropsies were performed within three hours after the fetuses were aborted. For the sake of brevity, the gross and microscopic descriptions of the various cases are combined and confined to the essential abnormal findings (table 1).

Tissues for microscopic study were fixed in 10 per cent formalin and, in one case, in Regaud's fluid. Representative blocks of tissue were embedded in paraffin and sectioned at 6 μ. Sections from each fetus were stained with hematoxylin and eosin, Giemsa, and Gram-Weigert methods. Liver and kidney sections were also stained according to the method of Levaditi for the demonstration of leptospiras. Periodic acid-Schiff, Ziehl-Neelsen acid-fast, and Pollak trichrome stains were used on selected liver sections.

Gross Observations.—These fetuses had been aborted during the last trimester of pregnancy. Soft, moist hair covered the entire body. The hoofs were pliable and well attached and the teeth had not developed. Body heat was still present in the majority of them. There was no discharge from any of the body openings, and the skin was usually edematous.

The subcutaneous tissues were infiltrated with clear, straw-colored fluid in all but 1 fetus, and 2 had widespread subcutaneous hemorrhages. Five fetuses had large amounts of clear, yellowish peritoneal fluid.

The outstanding gross lesion in all fetuses was a swollen, friable, and coarsely nodular liver (fig. 1, 2). It was yellow with red lines which followed the divisions of the primary lobules. The adjoining, depressed red lines presented a maplike appearance against the lighter background. The liver showed no difference in the appearance of areas supplied by portal, as opposed to umbilical, blood. The gallbladders seemed normal.

In 3 fetuses, the spleens were slightly enlarged and turgid with softened red pulp in which trabecular markings were indistinct, and in 3 others the serous membranes showed petechial hemorrhages. One also had "paint brush" hemorrhages over the compartments of the stomach.

Four fetuses exhibited petechial hemorrhages involving the nasal mucosa, larynx, trachea, bronchi, and esophagus (fig. 2). The lungs of 5 were not abnormal and showed complete fetal atelectasis, while 2 showed partial atelectasis. In 4, the lymph nodes about the head and neck were swollen, moist, and reddened.

Widespread hemorrhages of the skeletal muscles were seen in 2 fetuses; in the salivary gland and thymus in another. The pericardial sac often contained excess clear, yellowish fluid.

The kidneys were not abnormal, grossly, although the pelvic fat was often edematous. The gastrointestinal tract was not abnormal. The stomach contained grayish, stringy, mucoid material; the intestinal mucosa was covered with yellowish, bile-stained mucus; and thick, dark green meconium was found in the rectum.

Microscopic Findings.—The development

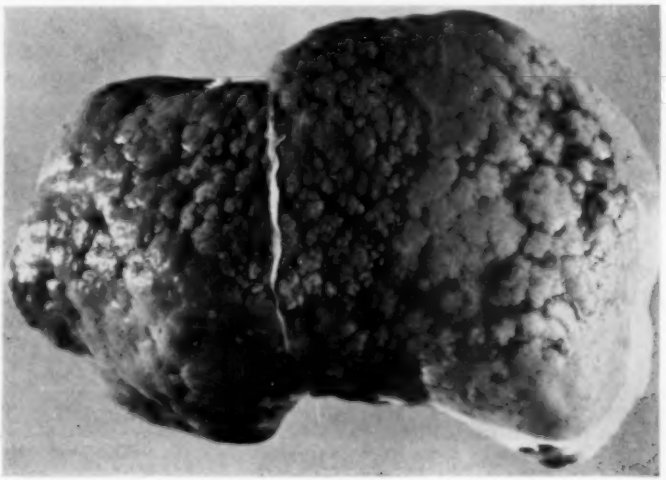

Fig. 1—Nodular liver from a fetus, showing hepatopathy.

of the liver lesions could be followed to a certain extent after studying sections from the various fetuses. The earliest lesions, such as occurred in fetuses 1342 and 1912, showed broad, interlocking bands of hepatic tissue undergoing early degeneration (fig. 3). The hepatic cells appeared shrunken, slightly dissociated, and stained brightly acidophilic. Coagulation necrosis was not evident during this stage. The involved areas also exhibited hyperemic sinusoids. This early degenerative change was principally centrilobular although the exact location was difficult to determine in fetal livers. This change was accompanied by moderate numbers of lymphocytes and macrophages in the portal areas.

The second stage in the development of the liver lesions, observed in fetuses 1344, 1348, and 1506, consisted of coagulation necrosis and hemorrhage (fig. 4). These changes were most pronounced in the peripheral areas. The few inflammatory cells present consisted of mononuclear cells in the portal areas, and mononuclear cells and neutrophils in the necrotic tissue.

The third stage in the development of the hepatic lesions was observed in fetus 1351 which showed fibrous replacement of the necrotic tissue.

In addition to these hepatic changes, the livers of fetuses 1351 and 1455 showed scattered foci of neutrophils, and in fetus 1455 many of the portal blood vessels were filled with neutrophils (fig. 5).

No rickettsial bodies could be demonstrated in livers or other tissues stained with Giemsa. No fungi, leptospiras, or inclusion bodies could be demonstrated by means of the periodic acid-Schiff method, the Levaditi silver stain, and Pollak trichrome stain, respectively. Acid-fast stains of liver sections showed no acid-fast bacteria.

Spleen sections showed edematous red pulp in fetus 1505, but no hyperemia. The Malpighian corpuscles were relatively small in all cases. Edema and hemorrhage in the normally wide interlobular septa of the fetal lungs were found in fetuses 1505, 1506, and 1912. There were submucosal edema and focal hemorrhages in the tracheas of many of the fetuses. The skeletal muscles showed interstitial edema and hemorrhage, but inflammation and degeneration were not observed. The tongue often

Fig. 2—Esophageal and tracheal hemorrhages (left) and nodular liver (right) from an aborted fetus.

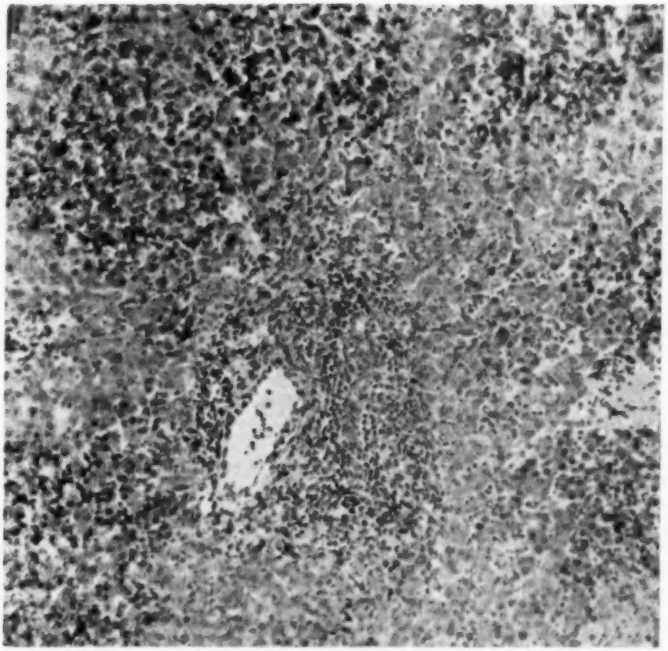

Fig. 3—Early hepatic changes showing foci of hepatic cell shrinkage and distortion around the periphery of the photograph. x 50.

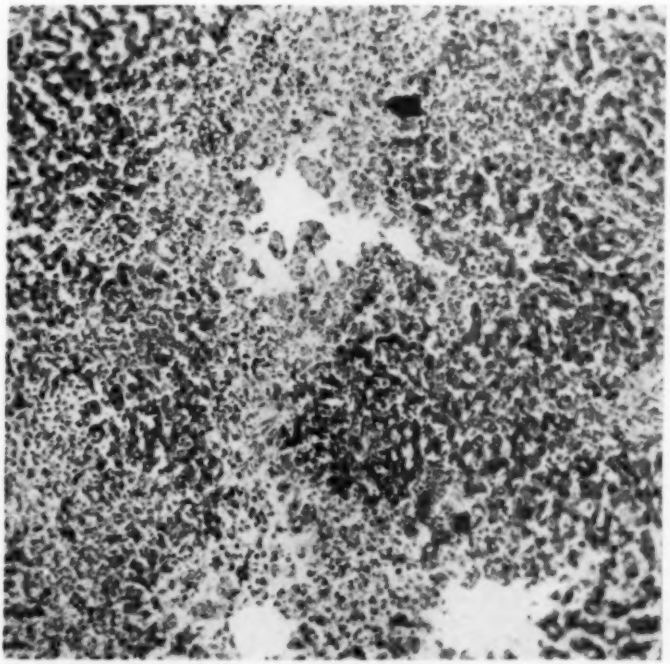

Fig. 4—Irregular areas of hepatic cell necrosis in fetus. x 50.

showed subepithelial edema and focal hemorrhages. Fetuses 1342, 1344, 1912, and 1506 showed hyperemia and edema of the lymph nodes. There was hyperemia in the kidneys of fetus 1912; a few deep cortical foci of neutrophils and lymphocytes in the kidneys of fetus 1351; and subcapsular foci of macrophages, lymphocytes, and plasma cells in fetus 1506.

Many of the fetal membranes were not found following abortion and most of those which were found were too decomposed for microscopic examination. Suitable membranes from 2 cows were examined. Cow 1348 showed a minor increase of mononuclear cells in the placental stroma and one unidentified membrane exhibited focal infiltrations of neutrophils in the stroma.

BACTERIOLOGICAL FINDINGS

Materials and Methods.—A routine bacteriological procedure was established for all fetuses of the abortion series and for aborted fetuses with similar gross pathology from other sources. Liver, spleen, kidney, lung, umbilical vein tissue and heart blood, and abomasal contents were inoculated into Difco tryptose agar plates with 7 per cent defibrinated bovine blood, into Difco brain-heart infusion agar plates with 10 per cent horse serum, and into Difco tryptose broth with 10 per cent horse serum for aerobic and anaerobic incubation. Selective mediums and techniques for the cultivation of Brucella, *V. fetus*,[5] pleuropneumonia-like organisms (PPLO),[6] Hemophilus,[7] and fungi were also used. The PPLO cultures were made in duplicate and incubated aerobically and anaerobically at 37C. The cultures for fungi were also made in duplicate on cornmeal agar and on Sabouraud's glucose agar, the plates were sealed and one of each pair left at room temperature, the other incubated at 37 C. All mediums for fungi were examined for 30 days.

Difco brain-heart infusion agar with the addition of 2 per cent Difco hemoglobin and 1 per cent Difco supplement A was used to isolate Hemophilus or other fastidous organisms. Fildes' peptic digest of blood,[8] in proportion of 5 per cent digest in Difco brain-heart agar, was also employed.

Classification was based on specific differential tests including fermentation reactions and followed Bergey's[9] terminology.

Results.—The purpose of this phase of the study was to determine the bacteriological flora present in the blood stream of cows before abortion, in aborted bovine fetuses, and in the uterus several months after abortion.

Blood collected from 2 cows before abortion revealed the presence of trypanosomes

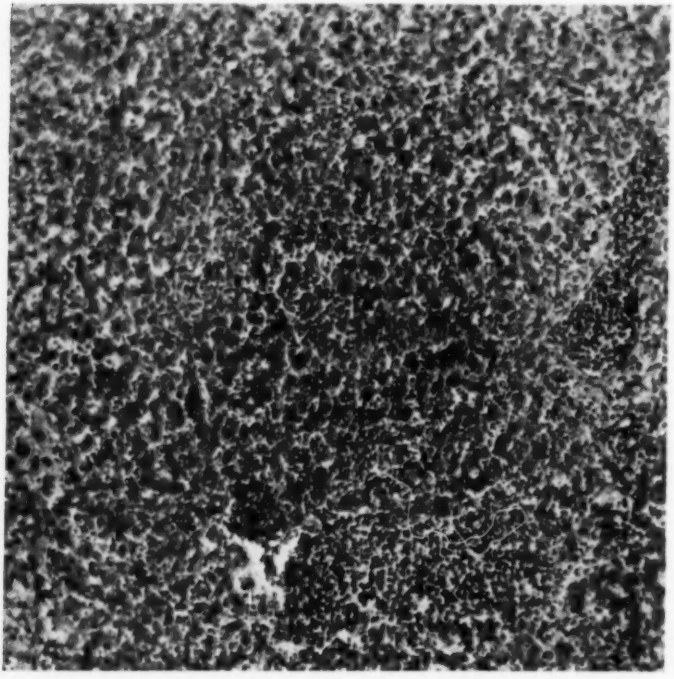

Fig. 5—Blood vessels and sinusoids filled with neutrophils in fetus liver. x 50.

TABLE 2—Bacteriological Findings on 14 Aborted Bovine Fetuses

Material collected		Organisms isolated							
Fetal tissue	No. of samples	Streptococcus unidentified	Str. viridans	Str. uberus	Str. fecalis	Micrococcus pyogenes	Other Micrococcus	Coli-aerogenes	Unidentified organisms
Heart blood	10	3	3	1	2	0	3	2	1
Abomasal contents	6	1	2	1	0	0	2	2	0
Spleen	6	2	1	1	2	1	1	2	0
Liver	6	2	0	1	2	1	2	2	2
Kidney	2	1	0	0	1	0	0	1	0
Umbilical vein	2	0	0	1	1	0	0	2	1
Lung	1	0	0	0	1	1	0	0	0
Peritoneal fluid	1	0	1	0	0	0	0	1	1
Placenta	3	3	0	0	0	0	0	1	2
Total	37	12	7	5	9	3	8	13	7

and gross contamination, respectively (cows 1462, 1530). The number of blood samples cultured was admittedly small and, therefore, does not give a true indication of the flora present in the blood stream of cows with impending abortion.

Cultural examination of 37 tissues from 14 fetuses failed to show the presence of Brucella, *V. fetus*, Hemophilus, fungus, or pleuropneumonia-like organisms. Of the bacteria isolated, streptococci predominated, being present in 33 tissues in 12 of 14 fetuses studied (table 2). *Streptococcus viridans* was present in seven tissues of 4 fetuses, *Streptococcus uberus* in five tissues of 1 fetus, and *Streptococcus fecalis* in nine tissues of 2 fetuses. In 12 tissues of 5 fetuses, an unidentified Streptococcus similar to *Streptococcus bovis*, but with no fermentation of lactose, was found. Micrococci were isolated from 11 fetal tissues with three of these isolates being *Micrococcus pyogenes*. Organisms of the coli-aerogenes type were isolated from 13 tissues of 6 fetuses and unidentified organisms from 7 others.

Easley *et al.*,[10] in a bacteriological examination of nongravid uteri of Hereford cows, found a wide variety of bacterial organisms with micrococci and streptococci predominating. Since many of the aborting cows involved in the present study (herd W) were being sent to slaughter, the uteri of 6 were collected for bacteriological examination six months following abortion. Four were gravid, containing fetuses about 3 months of age. The fluids surrounding the fetuses revealed *Str. uberus* in 1, an unidentified micro-aerophilic Streptococcus in 1, and no growth in 2. Of the two nongravid uteri, one showed no growth and the other contained a Micrococcus.

Results of Animal Inoculations.—The pathogenicity of the bacterial cultures and fetal tissues for various experimental animals was determined (table 3). Three cultures of streptococci inoculated intraperitoneally into young mice did not produce visible sickness or gross pathological changes. A Micrococcus culture and combined cultures of Micrococcus and Streptococcus failed to cause sickness or gross lesions when inoculated intraperitoneally into young mice. Blood from aborted fetuses injected intraperitoneally into young mice and guinea pigs gave negative results as did composite fetal liver emulsion in young mice.

Citrated blood collected from 3 cows during the febrile preabortion period did not produce any evidence of febrile response or sickness when inoculated intramuscularly into 3 calves 4 months of age. One cow, 6 months pregnant, inoculated intravenously and intramuscularly with blood collected from cow 1530 during the preabortion febrile period, developed no febrile response and calved normally. Two cows, 6 months pregnant, inoculated intravenously and intramuscularly with composite liver emulsion from 2 aborted calves, both calved normally without febrile reaction.

DISCUSSION

Since the development of specific cultural, serological, and vaccination procedures, it is possible to recognize and control the common types of bovine abortion such as brucellosis, vibriosis, and leptospirosis. In spite of these advances, abortion of unknown cause still remains a major economic and diagnostic problem in many areas. Among abortions of unknown cause,

an entity designated as epizootic bovine abortion became apparent when judged on the basis of fetal pathology.

The necropsy findings in these latter fetuses revealed a widespread acute and subacute degenerative process involving the liver with secondary suppuration in 1, and possibly in 2. It appeared that the liver lesions represented a primary degenerative process. The widespread edema, especially the ascites, and the generalized hemorrhages, most marked in the anterior respiratory tracts, appeared to be of noninflammatory origin and may have resulted from anoxemic, toxemic, or even hypoproteinemic states.*

The comprehensive bacteriological studies not only eliminated Brucella and *V. fetus* as the causative agent but also indicated that such organisms as Hemophilus, fungi, and pleuropneumonia-like organisms which require specialized cultural techniques are not responsible. By serological and staining procedures, Leptospira and acid-fast organisms were also eliminated. Limited studies on vitamin A, calcium, and phosphorus levels showed these metabolites to be within the normal range.

Further study of the bacterial flora and infectivity of blood collected during the febrile preabortion period should indicate whether organisms isolated from a fetus were the result of placental invasion following a preabortion septicemia in the cow, or were opportunists present in the uterus which invaded the fetus as a result of damage caused by another agent. The bacteriological findings would indicate whether Micrococcus and Streptococcus organisms were present in the lumen of the uterus but did not prevent conception. There is ample clinical evidence to indicate that heifers which abort during their first calving will produce normal calves in succeeding pregnancies. The presence of these bacterial organisms in the uterus during the second pregnancy supports the view that micrococci and streptococci are not the etiological factors but are actually opportunists which invade the fetus secondarily.

The various bacterial cultures and fetal tissues used in this series were not pathogenic for young mice when inoculated intraperitoneally. Blood from cows during the febrile preabortion period and fetal liver emulsion were not pathogenic for calves and pregnant cows when administered by the methods described.

TABLE 3—Results of Laboratory Animal Inoculations

Source	Material	Laboratory animal; Amount and manner of inoculation	Results
Fetus 1348	Streptococcus culture	6 young mice; 0.5 ml. i.p.*	Killed at 20th day; negative results.
Cow 1461	Micrococcus culture	6 young mice; 0.1 ml. i.p.	Killed at 20th day; negative results.
Fetus 1348 Cow 1461	Combined Streptococcus and Micrococcus cultures	6 young mice; 0.05 ml. i.p.	Killed at 20th day; negative results.
Fetus 1455	Streptococcus culture	6 young mice; 0.2 ml. i.p.	Killed at 20th day; negative results.
Fetus 1506	Fetal blood	6 young mice; 0.15 ml. i.p.	Killed at 20th day; negative results.
Fetus 1506	Fetal blood	2 young guinea pigs; 0.3 ml. i.p.	Killed at 20th day; negative results.
Fetus 1351 Fetus 1344 Fetus 1348 Fetus 1506	Composite liver emulsion	6 young mice; 0.15 ml. i.p.	Killed at 14th day; negative results.
Fetus 1627	Streptococcus culture	2 young mice; 0.5 ml. i.p.	Killed at 14th day; negative results.
Cow 1462	Blood during febrile period	4 month calf; 20 ml. i.m.	No febrile response
Cow 1461	Blood during febrile period	4 month calf; 20 ml. i.m.	No febrile response
Cow 1530	Blood during febrile period	4 month calf; 20 ml. i.m.	No febrile response
Cow 1530	Blood during febrile period	Cow 6 months pregnant; 20 ml. i.v., 20 ml. i.m.	No febrile response; calved normally.
Fetus 1505 Fetus 1506	Composite liver emulsion	2 cows, 6 months pregnant; 20 ml. i.v., 20 ml. i.m.	No febrile response; calved normally.

*Intraperitoneal inoculation (i.p.); intramuscular inoculation (i.m.); intravenous inoculation (i.v.).

*Since this paper was written, blood samples were obtained from 2 live calves born prematurely. These calves showed typical lesions of epizootic bovine abortion. In both cases, the blood showed levels well below the expected normal values of hemoglobin and erythrocytes along with evidence of accelerated erythropoiesis.

SUMMARY

Field and laboratory studies have revealed a previously undescribed abortion entity, designated as epizootic bovine abortion, characterized by sudden onset, severe losses, and a seasonal incidence for the period of July through October. Once established in a herd the disease occurred annually, with losses confined to first-calf heifers except during the first year when cows of all ages were affected. Fetal pathology revealed subcutaneous edema, ascites, generalized hemorrhage, and hepatopathy. It was not possible to demonstrate the etiological agent of these abortions by inoculation of young mice, calves, or pregnant cows with bacterial cultures or tissue emulsions from aborted fetuses.

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A chicken embryo, after one day of incubation, may survive almost freezing temperatures up to 76 hours. The slower the egg cools, the less damage.—*Poult. Sci., Nov., 1955.*

That anaplasmosis may cause permanent sterility in a bull is reported by Belgian research workers.—*Highlights in Agric. Sci.*

Pyometra Following Incomplete Oophorectomy in a Bitch

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On Dec. 26, 1955, a 3-year-old, German Shepherd bitch was presented for examination. She was in estrus and also showed typical signs of pyometra. She showed depression, a temperature of 104.0 F., a distended and markedly sensitive abdomen, and congested mucous membranes.

The owner reported that the bitch had been operated on and supposedly spayed 18 months before but, approximately six months later, had been in "season," was bred, and later whelped 6 pups normally. She had then been operated on a second time but again within six months developed signs of "heat," which continued for five weeks, at which time, she was presented for examination. The vaginal discharge was bright red to yellowish and varied from being fluid to thick. Her appetite was fair and she had recently been drinking a great deal of water. Occasional vomiting was noticed. Treatment consisted of 300,000 units of penicillin, 1 cc. of posterior pituitrin, and 50 mg. of testosterone every 12 hours for three days, at which time a second injection of testosterone was administered. Her temperature then was 102.2 F. but, when it rose to 103.2 F. the next day, surgery was advised.

After being anesthetized with sodium pentobarbital, two elongated, "sausage-like" bodies could be palpated in the abdominal cavity. A midline incision was made and the uterus was lifted out. The cornua were about 10 inches long, distended with fluid to over 1 inch in diameter, and the ovarian extremities were free. The body of the uterus was about ¼ inch in diameter. A complete, enlarged ovary was found on the left side and about half an ovary on the right side. Cotton ligatures, one white, the other black, were found on the fallopian tubes.

The ovaries and uterus were removed, the body being severed posterior to the bifurcation. The patient's convalescence was satisfactory. She was discharged in ten days.

Dr. Fitts is a general practitioner in Chagrin Falls, Ohio.

Multiple Genital Neoplasia (Mast Cell Sarcoma, Seminoma, and Sertoli Cell Tumor) in a Dog

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Philadelphia, Pennsylvania

THE FOLLOWING case report concerns a dog which had three histologically different tumors of the external genitalia and also exhibited marked signs of feminization. The animal thus presented an interesting clinicopathological picture.

A 10-year-old, male Boston Terrier was referred to the University of Pennsylvania Veterinary Hospital. The local veterinarian had diagnosed a malignant scrotal neoplasm associated with unilateral inguinal lymph node metastasis. The tumor, noticed for six months, had grown rapidly during the last five weeks of this period.

When examined, the animal was moderately active although obese, weighing 38 lb. and having a potbellied appearance. There was extensive alopecia and some pigmentation over the ventral aspects of the body, the inner thighs, and perineum, the affected skin having a thin, velvety texture. There was marked enlargement of the mammary glands, especially the nipples (fig. 1). The penis and prepuce were atrophied and the prostate gland was reduced to a firm nodule 1 cm. in diameter. The caudoventral aspect of the scrotum contained a thick ulcerated mass which involved an extensive portion of the scrotal wall. Only the atrophied, atonic left testis could be palpated in the scrotal sac. A large, firm, movable mass was present under the skin of the right inguinal region. The remainder of the physical examination was essentially negative.

The diffuse infiltration, extensive ulceration, rapid growth, and ill-defined borders of the scrotal lesion were indicative of a malignant neoplasm. The mast cell sarcoma which arises from the corium is probably the commonest scrotal tumor in the dog and has a marked predilection for Boston Terriers and Boxers.

The presence of the feminization syndrome (*i.e.*, mammary hypertrophy, symmetrical alopecia, genital atrophy, and obesity) in a unilateral cryptorchid strongly suggests the presence of an estrogen-secreting neoplasm of the undescended testis. In this animal, the left atrophic testis was scrotal in position, but the right testis which was enlarged and indurated was located in the right inguinal region. It was this undescended neoplastic testis which was misinterpreted as representing inguinal lymph node metastasis of the scrotal tumor. The clinical diagnosis was functional Sertoli cell tumor of the retained right testicle.

The following day, the animal was anesthetized with pentobarbital sodium after premedication with morphine and atropine. A radical amputation of the scrotum with the inguinal lymph nodes and a bilateral castration were performed. The dog made an excellent postoperative recovery and was discharged two days later under the care of the referring veterinarian. One month after surgery, the animal was in excellent condition. No signs of recurrence were observed along the scrotal incision. The feminization changes noted before surgery were still present (fig. 1).

EXAMINATION OF SPECIMENS

The surgical specimens were examined grossly and histologically.

Scrotum.—A firm, ulcerated tumor mass, measuring 7.5 cm. by 5.0 cm. by 7.5 cm. occupied almost one third of the scrotum (fig. 2). The tumor was firm, gray, and had an ill-defined irregular border. Histopathological study confirmed the clinical diagnosis of mast cell sarcoma. The inguinal lymph nodes were negative for metastatic tumor growth.

Right Testis.—This undescended testis was indurated and enlarged, measuring 5.0 cm. by 5.0 cm. by 5.0 cm. (fig. 2). Two distinct neoplasms were observed on cross section. A small, grayish white, oval tumor was surrounded by firm, gray neoplastic tissue. The central lesion was a Sertoli cell adenoma containing well-differentiated tubules filled with neoplastic Sertoli cells. The peripheral tumor was a seminoma which presented a malignant histological picture.

Dr. Brodey is associate in veterinary surgery, University of Pennsylvania, Philadelphia.

Left Testis.—This atrophic scrotal testis measured 1.3 cm. by 0.6 cm. by 1.3 cm. The testicular tissue was soft and dark brown on cut section (fig. 2). Histologically, there was extreme atrophy with complete absence of spermatogenesis.

DISCUSSION

The best results in the treatment of scrotal mast cell sarcoma are afforded by early diagnosis and radical resection of the tumor, which in many cases necessitates complete removal of the scrotum. In these instances, bilateral orchidectomy should be performed and the inguinal lymph nodes also excised. These regional nodes should be examined grossly and histologically for evidence of metastasis as this neoplasm spreads readily by the lymphatics, unlike most sarcomas.

The prognosis in mast cell sarcoma of the scrotum should always be guarded, especially if the inguinal lymph nodes are involved. In these cases, fulmination of growth characterized by extreme congestion and edema often follows surgical intervention. Palpation for possible iliac lymph node metastasis should be carried out as these nodes are involved in a fair percentage of advanced cases. Occasionally, these metastatic nodes in the sublumbar region are visible radiographically. Usually iliac node metastases are so extensive that surgery is not feasible. Adrenal cortical hormones are only palliative in the treatment of this tumor[1] and, thus, the importance of early diagnosis and adequate surgical measures can not be overemphasized.

Fig. 1—The ventral abdomen of a 10-year-old Boston Terrier one month after scrotal excision and castration. Note the preputial atrophy, gynecomastia, hyperpigmentation of the inguinal skin, and absence of hair growth.

This case also illustrates the importance

Fig. 2—Surgical specimens from the Boston Terrier. Note the irregular ulceration of the scrotal tumor (left) and large size of the undescended testis (top, right) as compared with the scrotal testis (bottom, right).

of careful palpation of the scrotal and inguinal areas. The clinician should decide whether the tumor has its origin from the scrotum, the testes, or both, as the prognosis for scrotal tumors is usually more guarded than for testicular neoplasms. Both testes should be identified as to size, consistency, and location.

The incidence of neoplasia in undescended testes is far greater than in normally positioned gonads. Therefore, bilateral castration should be performed on any cryptorchid animal past the age of 1 year to prevent neoplastic testicular change in years to come and to guard against furthering that genetic type.

Metastases of testicular tumors is rarely seen[2,3] and surgical therapy is effective in most cases. Neoplasms of the testes are extremely common in older dogs and careful palpation of these organs should be a part of every routine physical examination.

SUMMARY

A mast cell sarcoma of the scrotum is described in a 10-year-old, male Boston Terrier. This animal also had a seminoma and Sertoli cell tumor of the right inguinally positioned testis. The latter tumor had elaborated sufficient estrogen to cause feminization of the animal. The clinical management of these conditions is discussed.

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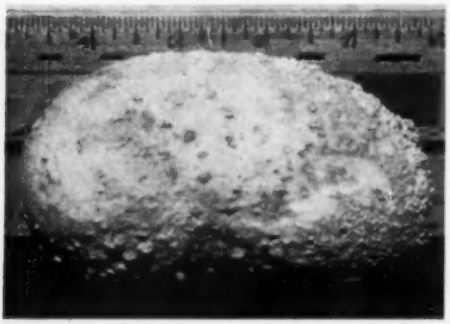
A Canine Urolith



This urolith, which was removed from a male Collie, 8 years old, was about 12 cm. long and weighed 14½ oz. The dog, while troubled with urinary incontinence for seven years, had remained healthy and active until the week when he developed hematuria and failed rapidly.

In spite of his extreme weakness, subnormal temperature, emaciation, and uremia, the owner insisted on surgery. The wall of the bladder was about 2/3 cm. thick and hemorrhagic. The dog did not survive.

This report was submitted by A. J. Steiner, D.V.M., and C. S. Steiner, D.V.M., Lexington, Ky.

Artificial Insemination of Swine

Artificial insemination, while not yet entirely feasible in swine, shows promise, although the litters may be smaller since all of the ova may not be fertilized. When perfected, it can mean: less transmission of disease in mating; reduced cost of breeding in small herds; facilitated breeding of young females to large boars or of large females to young boars; accelerated changeover to the meat-type hog; and insemination of more sows to superior boars, even after the death of the boars.—*Prairie Farmer, Feb. 18, 1956.*

Correcting Scrotal Hernia in a Bull

A scrotal swelling in a 3-year-old Hereford bull was diagnosed, upon rectal palpation, as a scrotal hernia. Surgical correction was accomplished through a 6-inch incision in the paralumbar fossa. The loop of intestine was manually removed from the inguinal canal and the internal ring, after being scarified with a needle, was partially closed with a simple suture on either side of the cord. The knots in the silk sutures were made at the abdominal incision and tied after being maneuvered down to the ring. After completing the operation, the bull was given a gallon of mineral oil. In three days, his appetite had returned and his feces were normal.—*Iowa State Coll. Vet., 1956.*

Rayon Wound Dressings

Contact rayon fabric dressings contribute to wound healing by permitting adequate drainage, preventing penetration of capillary buds into the fabric, reducing friction, and reducing infection. They are easily removed without pain or discomfort. —*Am. J. Surg., March, 1956.*

Cystotomy and Removal of a Urolith in a Shetland Mare

E. A. USENIK, D.V.M.; L. L. LARSON, D.V.M., M.S.; F. SAUER, D.V.M., M.S.

St. Paul, Minnesota

On March 23, 1955, a 9-year-old Shetland mare was presented, at the University of Minnesota Veterinary Clinic, with a history of partial anorexia, polyuria, and tenesmus during urination for several days prior to admission.

Examination revealed an obese pony, with a rectal temperature of 102.2 F., which exhibited tenesmus while voiding small quantities of urine. Rectal palpation revealed a large calculus which seemed to be embedded in the mucosa near the neck of the bladder. The blood-urea nitrogen was 10 mg. per 100 cc. of blood. Because of the cystitis, the mare was given 1,500,000 units of aqueous procaine penicillin and 1 Gm. of dihydrostreptomycin intramuscularly.

The following day, 250 cc. of "army anesthetic" (chloral hydrate, 4.26%; pentobarbital sodium, 0.96%; and magnesium sulfate, 2.12%) was administered intravenously and the mare was cast and restrained in dorsal recumbency. The ventral abdominal area was clipped, shaved, and scrubbed. Tincture of iodine and 70 per cent alcohol were applied to the skin. An incision 30 cm. long was made through the skin 5 cm. lateral to the mammary gland on the left side, extending obliquely towards the umbilicus. The abdominal tunic was incised in the direction of the skin incision. The left rectus abdominis muscle was bluntly parted in the direction of its fibers and then the peritoneum was incised. The incision was spread by means of an abdominal retractor and the bladder was brought through the incision with the aid of two stay sutures. An incision 9 cm. long was made through the vertex of the bladder. The bladder wall was thickened and the mucosa was hemorrhagic. The calculus, which was embedded in the mucosa, was freed and lifted out. Small pieces of the original calculus were removed by suction. Then, 5 Gm. of crystalline dihydrostreptomycin was injected directly into the bladder lumen. The bladder mucosa was sutured

From the School of Veterinary Medicine, University of Minnesota, St. Paul.

Approved for publication as scientific journal series article No. 3500, Minnesota Agricultural Experiment Station.

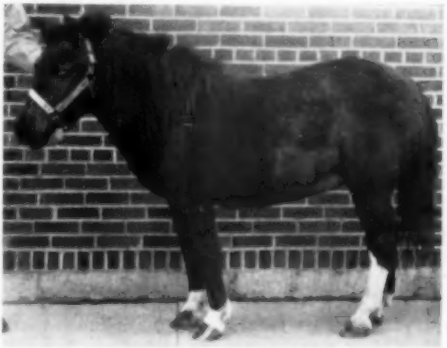


Fig. 1—The mare ten days following surgery for the removal of a urolith.

with a single row of simple continuous sutures of No. 0 chromic catgut, and the serosal and muscularis layers were infolded with two rows of continuous modified Cushing sutures of No. 0 chromic catgut. The parietal peritoneum was closed with a single row of simple continuous sutures of No. 1 chromic catgut, the abdominal wall with No. 4 catgut, and the skin with interrupted mattress sutures of No. 5 silk. An additional 200 cc. of army anesthetic was administered intravenously during surgery. Following surgery, 1,000 cc. of 5 per cent dextrose solution was administered intravenously.

The mare was given 2,000,000 units of aqueous procaine penicillin and 2 Gm. of dihydrostreptomycin intramuscularly, daily for four days, and 20 gr. of ammonium chloride orally, twice daily for five days.

The calculus, which measured 9.5 cm. long, 9.0 cm. wide, and 7.5 cm. thick, was of the mulberry type. It weighed 470 Gm. and was composed of calcium phosphate and calcium carbonate.

At the time of discharge, April 7, tenesmus was absent during urination although the mare still voided small quantities of urine and some edema of the abdominal incision area was still present.

Study of Parturition in the Bitch.—A radiological study of parturition in the bitch revealed that emptying of the cornua occurs in strict rotation when all pups are alive or when all are dead but the rhythm is disturbed when both dead and live pups are born; live pups usually precede dead pups.—*Vet. Bull., Feb., 1956.*

Clinical Data

Studies on Bluetongue
IV. Field Trial of a Modified Live Virus Vaccine

BLAINE McGOWAN, D.V.M.; D. G. McKERCHER, D.V.M., Ph.D.;
GORDON SHULTZ, D.V.M.

Davis, California

IN THE SUMMER AND FALL OF 1952, a disease of sheep, apparently new to California, made its appearance.[1] The disease was clinically diagnosed as bluetongue in September of that year and the virus was isolated and definitely identified by January of 1953.[2] In the ensuing time, much effort has been spent on experimental attenuation of the bluetongue virus and clinical trial of a modified live virus vaccine. The purpose of this paper is to describe the clinical trial and evaluate the results obtained from extensive use of an attenuated, live virus bluetongue vaccine.

HISTORY

Bluetongue, sometimes referred to as catarrhal fever, is a virus disease of sheep characterized by fever, depression, hemorrhagic inflammation and ulceration of the buccal and nasal mucosa, edema of the head and throat, nasal discharge, stiffness, lameness, and extreme loss of condition and weight. Under certain conditions, the morbidity and mortality can be high and the economic results serious. The only known method of natural transmission is by insect vector, principally the Culicoides, a common and widely distributed blood-feeding gnat.

Since the early 1900's, bluetongue has been a continuous and serious problem among sheep in the Union of South Africa, consequently, nearly all the research upon the disease *per se* and methods of prophylaxis originate from the workers of the Onderstepoort station. In 1908, Theiler[3] described a method of protecting susceptible sheep from bluetongue based upon the propagation of an avirulent strain of virus in susceptible sheep. With minor modifications this method was used in South Africa until recent years. In 1948, Neitz[4] published the results of a complete review of the bluetongue situation in South Africa. He reported, in part, that the Theiler vaccine was unsatisfactory because in some instances it did not produce an adequate immunity while at other times the reaction to the vaccine was too severe and caused considerable direct and indirect loss. The inadequate immunity was explained by the demonstration of a plurality of antigenically different strains of the virus and that the immunity to one strain could be broken down after reinfection by another strain. The undesirable effects were found to be due to an erroneous belief that the sheep virus could be attenuated by passage through the same host. Consequently, the Theiler[3] vaccine was capable of producing excessively severe reactions under adverse conditions, one of which was solar radiation of high intensity.

Progress toward a more satisfactory vaccine was initiated by Alexander[5] when he accomplished the adaptation of the bluetongue virus to the developing chicken embryo and when Alexander *et al.*[6] attenuated the virus by serial passage through chicken embryos. Subsequent work by Alexander and co-workers[7] produced a practical, polyvalent attenuated live virus vaccine which was highly efficient against bluetongue.

Essentially, the same methods and techniques were used in developing the vaccine under discussion in this report. The work dealing with attenuation and controlled protection experiments at this station is the subject of another report[8] but, to complete the background of the clinical trial described in this paper, a brief account of the production of the vaccine follows.

During the later stages of attenuation, every tenth passage of the virus was inoculated into sheep. At the forty-fifth passage of isolate BT8 and the fortieth passage of isolate BT11, the response in susceptible sheep was limited to a 1- to 2-degree rise in temperature with no inappetence, depression, or other clinical signs of reaction. An occasional animal, however, had a 3- to 4-degree rise in temperature. Consequently, the passages used for experimental vaccine production were the fifty-seventh passage of isolate BT8 and the fifty-second passage of isolate BT11. To determine their stability of attenuation, the forty-fifth egg embryo passage of BT8 and the fortieth egg embryo passage of BT11 were injected into sheep. On the seventh, eighth, and ninth days postinoculation, these animals were bled and additional sheep were injected with pooled blood from each group. The same process was repeated for a third subpassage. The reactions were similar in all groups of sheep, being limited to a thermal response. On subsequent challenge with fully virulent bluetongue virus, these sheep were completely immune.

A similar subinoculation procedure and virulent virus challenge was conducted at the fifty-seventh egg embryo passage of isolate BT8 and the fifty-second egg embryo passage of isolate BT11 with similar results. Subsequently, a small quantity of experimental vaccine was produced which, under controlled experiments, demonstrated a high de-

School of Veterinary Medicine, University of California, Davis (McGowan and McKercher), and Bureau of Livestock Disease Control, Sacramento, Calif. (Shultz).

gree of safety and efficacy. It was felt, therefore, that an extensive field trial was justified.

METHODS AND MATERIALS

The vaccine* used in these trials was a vacuum-dried suspension of chicken embryo tissue infected with two modified California isolates BT8 and BT11. The former had been modified by 57 serial egg passages, the latter by 52 passages, and both had been found by previous sheep inoculations to no longer produce symptoms and lesions of bluetongue.

In these trials, the vaccine was handled in the manner prescribed, proper regard being given to refrigeration and to its utilization within two hours after reconstitution. The product used reconstituted quite rapidly and in all respects was very convenient to use under field conditions. The procedures followed were those which would be expected in routine practice in the field. A modified automatic syringe was employed which allowed the operator to vaccinate at the rate of 500 sheep per hour. A 2-cc. dose was injected subcutaneously on the dorsal aspect of the neck just anterior to the scapulae. In all, 8,971 sheep, involving 11 ranches, were vaccinated. The premises were picked to represent, in so far as possible, a cross section of the sheep population of the state. Approximately 10 per cent of the sheep in each flock were left unvaccinated for control purposes. Identification of vaccinated and control animals was maintained by wool brands and individual ear tags. Of the first 3,000 sheep vaccinated, each received 2 cc. of a 1:300 dilution of the vaccine, or approximately 650 embryo lethal doses. The last 5,971 sheep vaccinated received 2 cc. each of a 1:30 dilution of the vaccine or approximately 6,500 embryo lethal doses.

Six weeks subsequent to vaccination, approximately 3 per cent of the vaccinated animals from each flock, together with about half that number of controls, were obtained† and assembled at the School of Veterinary Medicine at Davis. All were challenged with 2 cc. of a 50 per cent whole blood virus in OGG‡ solution. The challenge virus had been harvested at the peak of the febrile reaction from sheep infected with bluetongue virus. The same challenge material and subcutaneous inoculation method was used throughout. Ten presumably healthy and normal sheep were added to the vaccinated and control animals to serve as temperature controls. This procedure has been found to be very helpful in dealing with a disease like bluetongue where in some animals the only measurable response may be thermal. Temperatures and general health observations on all sheep were recorded daily for 14 days. The vaccinated animals, virus controls, and temperature controls were run together and had access to dormant alfalfa pasture and a good quality of alfalfa hay. Daily, after initial symptoms developed, the whole group was driven slowly around the pasture for about ½ mile just prior to being penned for recording of temperatures and physical examinations. This procedure quickly revealed the sick animals since they could not keep up with the flock.

*Supplied by the Research Division of the American Cyanamid Co.

†Sheep from one of the above, vaccinated bands were used for additional challenge tests to be reported at a later date.

‡A virus preservative consisting of 5 Gm. potassium oxalate, 5 Gm. phenol, 500 cc. distilled water, and 500 cc. glycerin.

RESULTS

The only clinical reaction observed, following the field vaccination, was a moderate hyperemia of the muzzle and ears which occurred in about 10 per cent of 300 grade ewes in one flock. This reaction lasted for two days and was not accompanied by any depression or inappetence. No other observable clinical reactions were recorded in the vaccinated animals.

When the 237 vaccinated sheep were challenged (table 1), 218 (92.0%) developed only a mild or no reaction, 18 (7.6%) a moderate reaction, and 1 (0.4%) a severe reaction. This indicated a highly significant degree of protection. Of the 116 nonvaccinated control sheep challenged, 84 (72.4%) developed moderate to severe reaction and were considered frank cases of bluetongue. Of the remaining sheep, 21 (18.1%) had a mild reaction and 11 (9.4%) no reaction. This indicated a satisfactory order of virulence for the challenge virus employed.

It is of interest that there was no difference in distribution of the degree of protection afforded to the animals receiving 650 egg embryo lethal doses as compared with those receiving 6,500 such doses. This is in agreement with experience gained by the use of other modified live virus vaccines where immunity is thought to be due to an actual multiplication of the attenuated virus in the recipient animal.

Seven control sheep died from ten to 16 days following challenge, which is considered the usual mortality period. All of these

TABLE 1—Results of Challenge with Bluetongue Virus of Vaccinated and Control Sheep

Reaction	Vaccinated sheep	Control sheep
Severe[1]	1 (0.4%*)	52 (44.8%†)
Moderate[2]	18 (7.6%*)	32 (27.8%†)
Mild[3]	64 (27.0%)	21 (18.1%)
None	154 (64.9%)	11 (9.4%)
Totals	237	116

*Eight per cent considered immunization failure; †72.6% considered frank bluetongue.

[1]Frank bluetongue symptoms and lesions. [2]Two or more degrees of temperature rise plus buccal hyperemia and some swelling of the lips. [3]One- to 2-degree rise in temperature; no other symptoms.

animals gave a typical bluetongue febrile reaction from the seventh to the ninth day followed by characteristic symptoms.[9] On necropsy, 1 of the 7 had a caseous abscess of the right kidney and another had a concomitant acute pneumonia. None of the others showed significant gross pathological changes other than those associated with bluetongue.

Four vaccinated animals died following challenge, but none of the deaths was attributable to bluetongue.

DISCUSSION

A satisfactory degree of immunity was obtained by vaccinating sheep with an egg-adapted and -attenuated bluetongue virus vaccine. The results in most respects are comparable with those reported from South Africa. The duration of the immune response was not determined in this trial but work on that phase of the problem has been initiated.

It should be recalled that the Onderstepoort workers have reported a plurality of field strains of bluetongue virus in South Africa. To date, only the one immunogenic strain has been isolated in the United States.

Cross animal immunity experiments with the infective agent received from all states where bluetongue has been positively diagnosed have been accomplished at this station and, to date, the attenuated California isolate has given full protection. However, other strains of this virus may appear against which this vaccine will not give protection.

SUMMARY

1) Data involving 8,971 vaccinated sheep demonstrate excellent protection and apparent safety from the use of a live chicken embryo-adapted and -attenuated bluetongue virus vaccine.

2) Of 237 animals challenged six weeks after vaccination, 91.9 per cent demonstrated a satisfactory degree of immunity.

3) Of 116 nonvaccinated control animals challenged, 72.6 per cent developed frank bluetongue.

ADDENDUM

Following this work, there was widespread use of commercial vaccines. Some losses occurred in newborn lambs dropped by ewes vaccinated in early pregnancy. The definite cause of these losses has not been determined, but work by Shultz and DeLay[10] offers evidence incriminating the use of the live chicken embryo-adapted and -attenuated bluetongue virus vaccine on ewes in the early part of pregnancy.

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[9]McGowan, Blaine, and McKercher D. G.: Studies on Bluetongue. II. Field Experiences with Bluetongue in California. Proc. Book, AVMA (1954): 61-64.

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Oil Granulomas in Man

Of 6 cases which later proved to be granulomas due to the introduction of oily substances or wax into the tissues, 4 were incorrectly diagnosed as cancer and serious, unnecessary operations were performed. One was due to almond oil and 3 were paraffinomas, 1 of which resulted from packing a breast abscess with bismuth, iodoform, and liquid paraffin paste. Of the 2 correctly diagnosed, 1 was the result of 15 injections of penicillin in beeswax and peanut oil.—*J.Am.M.A., Feb. 5, 1956.*

Immunity to myxomatosis is not transmitted from the dam to her offspring either through the placenta or the milk.—*Vet. Bull., Feb., 1956.*

What Is Your Diagnosis?

Because of the interest in veterinary radiology, the JOURNAL publishes this month, and will continue to do so for the next several issues, a case history and accompanying radiographs depicting a diagnostic problem.

Make your diagnosis from the picture below—then turn the page ▶

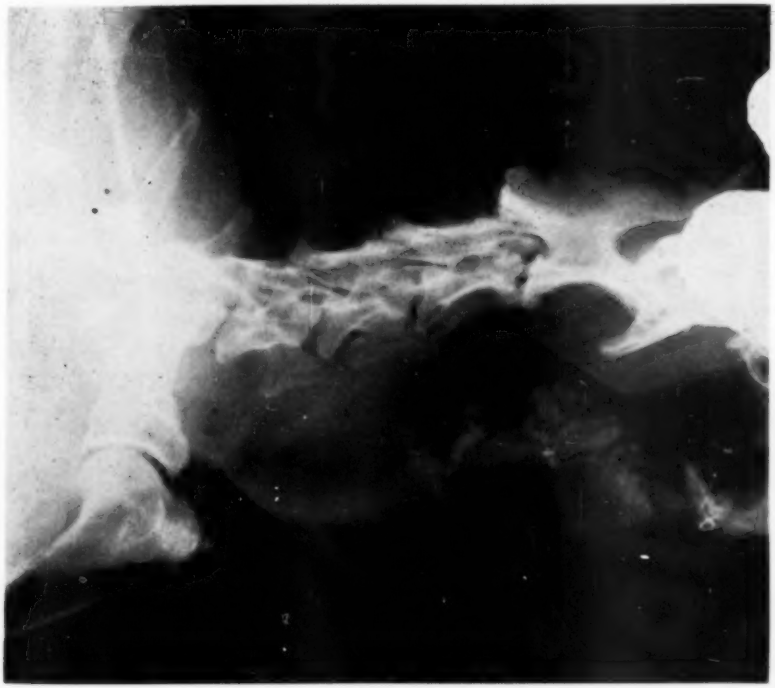


Figure 1

History.—A cachectic female Pointer, 11 years old, had difficulty in swallowing food. She had a diffuse enlargement in the ventral cervical region which extended from the thyroid region toward the chest. The trachea was misplaced ventrally but it was not involved in the process. Two cubic centimeters of sanguineous fluid was aspirated from the lower end of the enlargement, which was soft and edematous.

A stomach tube, when passed through the esophagus, met resistance when it reached the enlargement. A radiograph was taken (fig. 1).

(Diagnosis and findings are reported on the next page.)

Here Is the Diagnosis

(*Continued from preceding page*)

Diagnosis.—A mixed malignant tumor in the thyroid.

Comment.—The diagnostic problem was to determine whether the enlargement was the result of a neoplasm or of a foreign body. The aspiration of sanguineous fluid suggested a foreign body; the calcified tissue suggested a neoplasm. The mass was excised with great difficulty. A 2-mm. portion of the esophageal wall was removed with it. For a short time, healing was satisfactory,

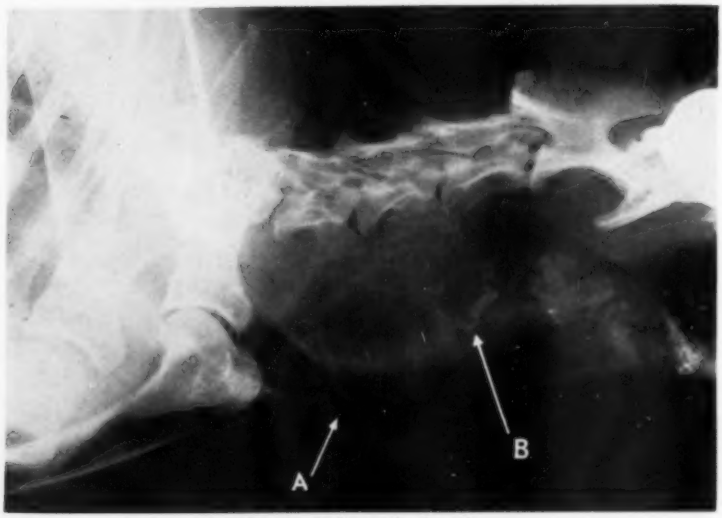


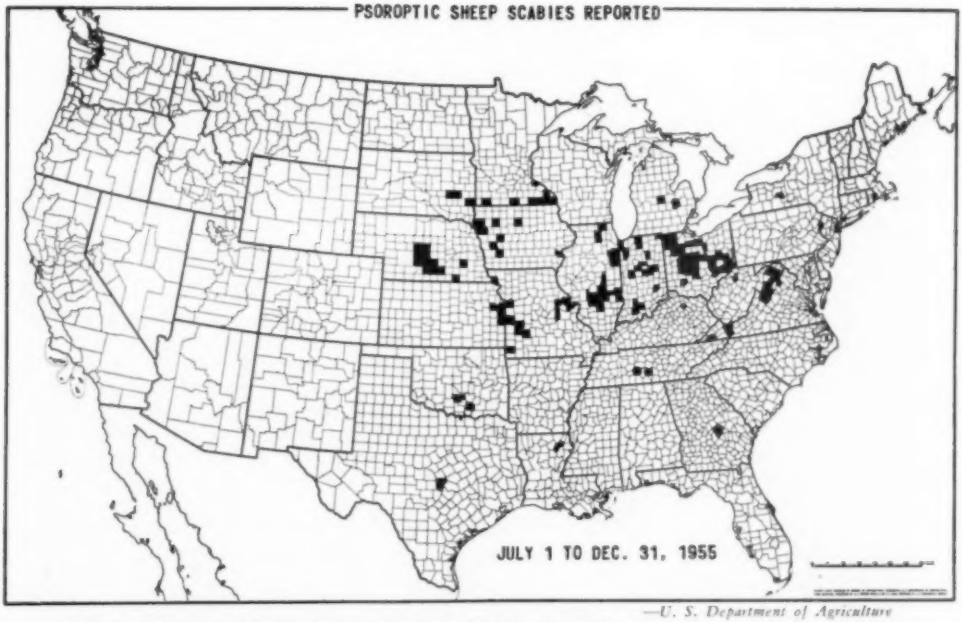
Fig. 2—Radiograph of neck.
A—trachea; B—calcified tumorous mass.

with the dog eating and gaining. However, when the dog's condition began to decline, euthanasia was performed.

The mass was found to be composed of epithelial and connective tissues, with extensive calcification. The tumor was thought to have originated from the right lobe of the thyroid. Small metastatic nodules were present in the lung tissue.

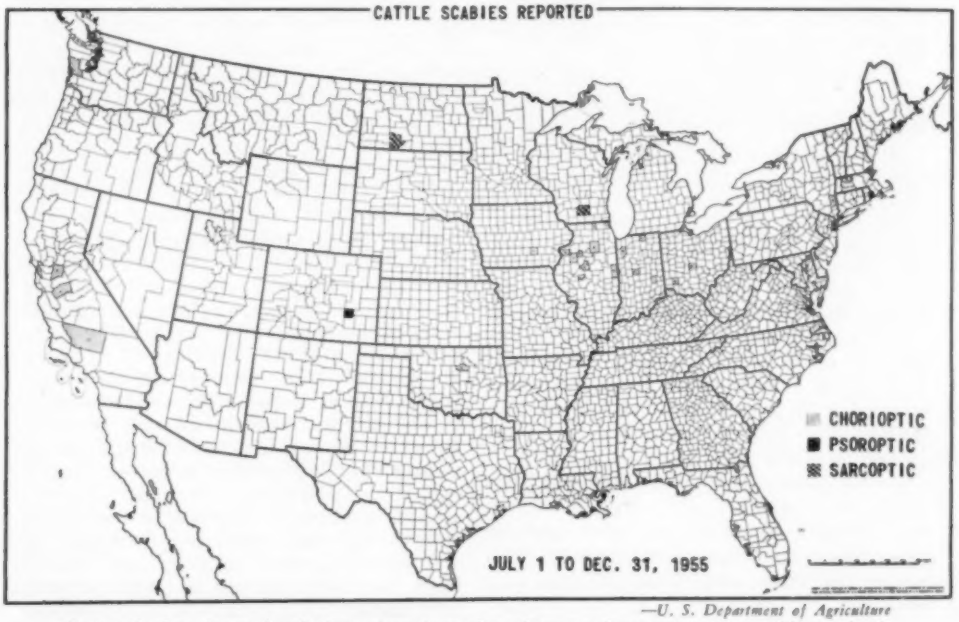
This case was referred by Dr. T. L. Graham, Arthur, Ill., to Drs. A. G. Schiller, P. D. Beamer, and A. Watrich, College of Veterinary Medicine, University of Illinois, Urbana, Ill.

Our readers are invited to submit case histories, radiographs, and diagnoses of interesting cases which are suitable for publication.



—*U. S. Department of Agriculture*

Psoroptic sheep scabies was diagnosed in the last half of 1955 in the same number of states (20) as in a similar period in 1954. However, the disease was found in 31 per cent more counties and in 52 per cent more flocks.



—*U. S. Department of Agriculture*

During the last six months of 1955, psoroptic cattle scabies was diagnosed in two neighboring herds in Colorado. There had been no sales from one herd, and animals sold from the other had been dipped at the time of sale. During January, 1956, the disease was diagnosed in one herd in Texas, one in Kansas, and one in Iowa.

Cattle which originated in Colorado had been added recently to the Kansas and Texas herds and had been added in October, 1954, to the Iowa herd.

Hog Cholera Vaccination in Germany

Approximately 150,000 pigs have been vaccinated in the past nine years, in and near Germany, with the Schleissheim crystal-violet vaccine, with uniformly satisfactory results. When, in 1952, a rabbit-origin, modified live virus vaccine was compared (in Germany) to three inactivated vaccines (2 from the U.S.D.A.), all were found noninfectious, thus harmless, but the immunizing effect of the modified vaccine was "better than" the others.

However, in 1955, others observed that a "lapinized vaccine caused widespread mortalities among swine affected with chronic diseases." Referring to a survey reported in the JOURNAL (March, 1954: 228), the author states he has no reason to doubt the findings since research had established that leukopenia occurred after vaccination with modified live vaccines.

Because of the "flat hog cholera curve" in western Germany, it was recommended that only crystal violet vaccine be used there.—[*H. Schellner and W. Rauscher: Vaccination in Hog Cholera. Bericht des 1. Kongresses der Deutschen Veterinärmedizinischen Gesellschaft (March 26-27, 1955): 72-74.*]

Experimental Chronic Hog Cholera*

Several cases of chronic hog cholera were produced under experimental conditions. The course of the infections varied from 53 to 95 days. All exposed animals succumbed, and hog cholera virus was isolated from the spleens of each. In 1 case, a subsequent passage of the virus also produced chronic hog cholera, but the virus reverted to an acute type on the third passage. In another series of experiments, virus isolated at 50 and 85 days proved extremely virulent with one- and two-day incubation periods, five- and six-day courses, and encephalitic reactions.

All the chronic cases which resulted from inoculations occurred while testing various virus titrations. However, other chronic cases followed early contact infection, indicating that more than virus dilution was involved.

*This is the abstract of an article, "Variations in the Virus of Hog Cholera—A Study of Chronic cases," by Dunne et al., which appeared in the AVMA "Proceedings Book" (1955): 148-153.

Cytopathic Changes in Tissue Cultures Derived from a Pig Infected with Hog Cholera Virus

(An Abstract)

D. P. GUSTAFSON, D.V.M., Ph.D., and C. M. POMERAT, Ph.D.

Lafayette, Indiana

Changes have been observed in living swine cells *in vitro*, following exposure to hog cholera virus, which may be useful in the diagnosis of hog cholera and may speed up research on various strains of the virus. Most will agree that an adequate means of detecting the presence of hog cholera virus in the laboratory is desirable but is not now available except for the expensive and cumbersome inoculation of susceptible swine. Many methods of accomplishing this end have been proposed through the years from various parts of the world but none appear to be in wide use.

In the search for such a method, it seems likely that the study of living swine cells grown *in vitro*, commonly called tissue cultures, might reveal some observable change when exposed to the virus of hog cholera. The work reported here may represent the basis on which a useful means of manipulating hog cholera virus may be developed.

Comparisons were made between tissue cultures of ten tissues involving a total of 600 explants prepared from a pig six days following inoculation with hog cholera virus and similar cultures from a noninoculated litter mate. Changes were observed to be most pronounced in outgrowths of cultures of spleen and lung. Endothelial cells of the outgrowth from spleen cultures had observable changes only in the cytoplasm; such changes were in the form of increased granularity and vacuolization in endothelial cells of the outgrowth. The margins of the cells were roughened and somewhat irregular as compared with the smooth appearance of comparable areas in control cultures. Comparison of lung cultures showed a marked reduction in cytoplasm and nuclear size, increased vacuolization, and death in some cells in the cultures from the inoculated pig as compared with comparable cells from its noninoculated litter mate.

This is an abstract of an article which appeared in the American Journal of Veterinary Research (April, 1956):165.

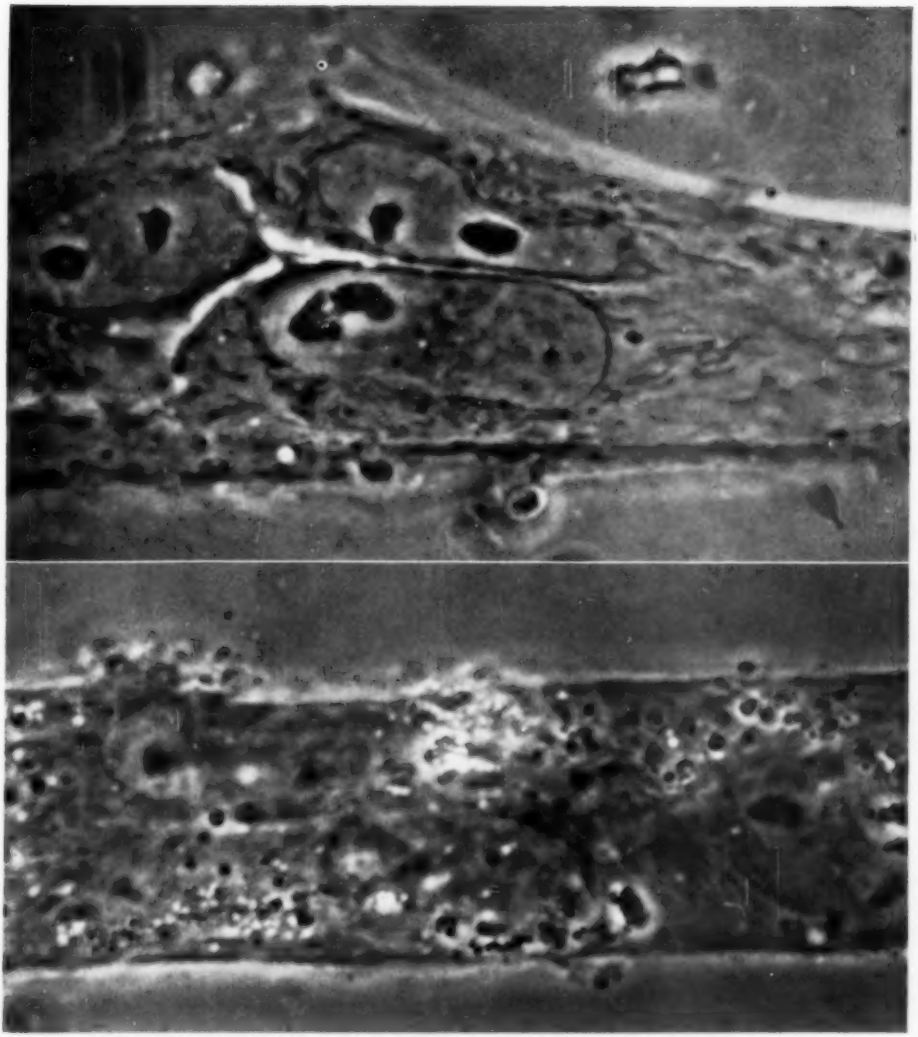


Fig. 1 (Top)—Spleen culture endothelium from uninoculated pig. x 2,310.

Fig. 2 (Bottom)—Spleen culture endothelium from inoculated pig showing marked granularity, vacuolization, and irregularity of cell margins. In cinematographic records, the vacuolization and irregularity of cell margins might appear to be bubbling like a boiling heavy liquid. x 2,310.

Photomicrographic records of the living cells were made by means of phase microscopy (fig. 1 and 2). Time-lapse phase cinematographic records show considerably more lymphocytes moving over the cultures from the noninoculated pig than in the cultures from the inoculated one, among the further differences demonstrated by this technique.

While these changes are not thought to be specific for the presence of hog cholera virus, they are considered to be due to its presence. If further studies of these changes show them to be useful within the bounds of laboratory practicality, many benefits may be forthcoming. This could make specific identification of hog cholera virus possible, such as in questionable field cases, through serum-neutralization tests in a more economical fashion than now possible. Titrations of virus-containing materials and antiserums could be made which would be of considerable value to commercial standardizations and to researches into duration of immunity and stability of modified strains of virus.

Losses in Cholera-Vaccinated Hogs

Modified hog cholera virus vaccines were introduced with the hope that they would eliminate postvaccinal problems (serum breaks) caused by "overreactions" from the failure of the simultaneously injected serum to protect against the virulent virus. Instead, they added another variable factor. Of such "breaks," 38 were studied, mostly in Iowa. Infectivity tests were made in all cases, both in cholera-susceptible and in cholera-immune pigs.

Of the 38 herds, 20 had been vaccinated with modified live virus vaccines of either rabbit or porcine origin, six with tissue culture-modified live virus vaccine, two with inactivated vaccines, and ten with serum and virulent virus.

In the 20 herds vaccinated with a modified virus, no virus was recovered from four herds; a variant virus was recovered from one herd vaccinated two months previously with a swine-origin vaccine and from two herds vaccinated about a week previously with a rabbit-origin vaccine; regular virus was recovered from three herds vaccinated with each (those which had received rabbit-origin vaccine sickened in about 6 days—mortality 1%; and those vaccinated with swine-origin vaccine sickened in about 43 days—mortality 5%); in three herds (rabbit-origin vaccine), the pigs sickened in eight days and the recovered agent would immunize experimental pigs; and in the remaining four herds (3 porcine and 1 rabbit origin), the reactions of the experimental pigs was so variable that the results could not be classified.

In the six herds vaccinated with the tissue-cultured vaccine: a variant virus was recovered from two herds which sickened 85 and 108 days, respectively, after vaccination; regular virus was recovered from three herds an average of 31 days after vaccination; and an agent which would immunize against cholera was recovered from one herd which sickened 91 days after vaccination.

From the two herds vaccinated with an inactivated vaccine: a variant virus was recovered from one herd which sickened five days after vaccination and regular virus was recovered from the other herd.

From the ten herds vaccinated with serum and virulent virus: no virus was recovered from two herds; a variant virus was recovered from one herd which sickened 49 days after vaccination; regular virus was recovered from six herds which sickened an average of 63 days after vaccination (mortality, 2%); and in one herd, the results were too variable to classify. —[*J. P. Torrey: Studies on Modified Virus Vaccine for Hog Cholera. U.S. Livestock San. A., 1955. In press.*]

Hog Cholera Research to Continue

The study of anti-hog cholera serum and virus, hog cholera vaccines, and special research on so-called "variant" virus, which is sponsored by the Associated Veterinary Laboratories, Inc., and was started in 1951, will be continued through 1957 at the Veterinary Medical Research Institute of Iowa State College. A total of $149,000 has been appropriated for this eighth year of study.—*Am. Found. Anim. Health, Des Moines, Iowa.*

A Pneumotropic Hog Cholera Virus

During two enzootics of pneumonia-like disease of young swine, in France in 1953, the only virus recovered was capable of producing a disease indistinguishable from swine fever (hog cholera). Susceptible pigs succumbed in ten to 18 days while immune pigs were not affected.

In a third instance, a virus was recovered at an establishment where some of the pigs had been vaccinated for six to ten weeks with a modified virus vaccine, rabbit origin. The disease started as a pneumonic condition but gradually both the vaccinated and nonvaccinated animals developed lesions typical of cholera. This virus, after being passaged three times through rabbits, would produce an "attenuated" syndrome in swine and the animals, when destroyed after 23 days, showed characteristic cholera lesions.

This suggested to the authors that the lapinized virus used for vaccination, under undetermined conditions, could again manifest its virulence for swine.—[*P. Goret, L. Joubert, C. Mackowiack, and F. Lucam: Essais dé dépistage dé la pneumonie a virus du Porc en France. Bull. Acad. vét. France, 26, (Dec., 1953):569-575.*]

Johne's disease has been diagnosed in a number of flocks of sheep in West Germany.—*Vet. Bull., Feb., 1956.*

Moot Questions About Hog Cholera

Hog cholera seriously hampered the development of the swine industry in this country until a method of immunization was developed. After that, cholera seemed to become a relatively simple and readily controllable disease. However, in 1949 and 1950, so-called "variants" of the virus, against which the serums used gave little protection, caused fatal "reactions" in many thousands of vaccinated animals. Now, almost everything related to hog cholera seems to have become much more complex.

Are Variants Strains or Phases?

While the cholera viruses which show variant characteristics are sometimes called variant *strains*, some authorities believe that they may revert to their original state and are but a variant *phase* of the same strain of the virus. The variants as well as the "W" virus, reported in 1951, which would immunize against cholera without producing serious illness, apparently occurred in nature.

Whether the viruses modified in the laboratory for vaccinating purposes could or do also revert to a pathogenic state is a question of vital interest.

The experience in France in 1953 (*see* p. 462) would seem to indicate that this is a possibility. Furthermore, the reports by Schwarte (*J.A.V.M.A.*, April 1, 1956: 352) and by Torrey (*see* p. 462) would seem to indicate that this possibility needs intensive study. Torrey recovered a virus with variant characteristics from three herds vaccinated about a week previously without serum (2 with lapinized, 1 with inactivated vaccine) and from four herds vaccinated 49 to 108 days previously with serum and a virus (3 with modified and 1 with virulent). He also recovered an agent other than regular virus which would immunize against cholera (8 days after rabbit-origin vaccine without serum from 3 herds; 91 days after tissue culture vaccine with serum from 1 herd).

Which Vaccine to Use?

Vaccination against cholera, never a simple procedure, also has become more complicated. With the original serum and virulent virus method, skill in estimating the ability of the pigs to "stand" vaccination and the dosage of serum required was imperative. Now it is also necessary, in deciding which vaccine to use, to consider the length of protection desired and the relative cost.

Prior to 1951, at least 95 per cent of the swine vaccinated in this country were given serum and virus; the others were given inactivated vaccines (crystal violet vaccine and BTV). In 1955, only about 29 per cent of all vaccinated swine received serum and virulent virus; approximately 40 per cent were vaccinated with modified viruses with serum; 25 per cent with modified virus (rabbit origin) with or without serum; and 6 per cent with inactivated vaccine.

Why Not Ban Virulent Virus?

With 71 per cent of the vaccinating now being done with vaccines, it would seem that the time has arrived for the nation to follow the lead of Alabama and a few other states and outlaw the use of virulent virus.

Only about one fourth of 1 per cent of the swine in this country are now fed raw garbage, and only a few of them are in states where cholera is prevalent. Therefore, vaccinal virus would now seem to be the chief source of the disease.

The only logical reason for continuing to vaccinate with virulent hog cholera virus would seem to be the relatively solid immunity it produces. Practitioners in areas where erysipelas is troublesome may justify the greater cost, due to the larger dose of serum, since it seems to protect for a few weeks against acute erysipelas as well as cholera. But, do these advantages offset the dangers involved?

Confused Terminology

Introduction of the many new cholera vaccines has failed to eliminate cholera-associated problems but it has complicated the terminology. In the past, serum and virus vaccination problems were considered either as vaccinal reactions or "serum breaks," usually six to 14 days after vaccination, or as immunity failures or "virus breaks" which occurred more than three weeks after vaccination, when the passive

immunity expired. However, it is now suggested that the troublesome agent is associated with the vaccine and may be harbored for a considerable period before it causes trouble. If so, the term "post-vaccination" could rightly refer to a period much beyond the previously accepted 14-day limit for vaccinal reactions.

Furthermore, the term "serum break" could not be applied to these six- to 14-day "breaks" when no serum was used, and the term "virus break" could be applied only when the late-developing disease is regular hog cholera.

How Does Hog Cholera Kill?

Cholera is a relatively lesionless disease, the chief gross lesion being the tiny hemorrhages in a few organs. How these hemorrhages are produced may be indicated in the Gustafson abstract (p. 460), showing how the virus grows in endothelial tissue cultures. Symptomatically, the marked lethargy, depression, and occasional opisthotonoid convulsions indicate considerable nervous involvement. There are microscopic changes in certain brain tissues but they also seem relatively minor.

How Did the Virus Originate?

When the eradication of cholera is discussed, certain questions invariably arise, such as—where did the virus originally come from and how did it survive between attacks when they were rare? Shope ("Advances in Veterinary Science," vol. 2, 1955: 13) suggests that "some wild animal indigenous to the area" must have been the "primary host" for the virus, without showing signs of infection, and that this host "occasionally transmitted" the virus to swine. He also suggests that the later, increased prevalence of hog cholera indicated that "a secondary reservoir host had entered the picture." This is indeed interesting and logical speculation.

A "reservoir host" may have been required to perpetuate cholera prior to the eras of virulent virus vaccine and of shipment of fresh meat but, since then, such a host would not seem to be essential. The search for such has been futile. Furthermore, such a host must not have existed in Canada where the disease has been easily eradicated, only one epizootic (1953) having occurred there since 1946.

Actually, cholera rarely occurs in rural areas where herds are widely separated and where swine are rarely vaccinated.

Is Cholera a Cyclic Disease?

Much has been said about cholera occurring in cycles. The greatest losses were in 1913 and in 1926, when the supply of anti-hog cholera serum became exhausted. Since then, any resemblance to a cyclic recurrence could be interpreted as being due more to the effects of economic conditions on vaccinating programs than to other factors.

It may be just a coincidence, but the consistently decreasing prevalence of cholera reported in recent years bears an interesting resemblance to the concurrent decrease in the use of virulent virus in vaccinating.

Shope also reports that, in "breaks" following vaccination with "attenuated lapinized hog cholera virus," the virus recovered "is apparently fully virulent hog cholera virus. . ." and, therefore, "this product is not the one of choice . . . for the eradication of the disease."

Why Not Try a No-Vaccine Area?

However, to learn whether factors other than vaccinal virus and the virus contained in garbage are responsible for perpetuating cholera, a considerable area where cholera has been prevalent, should be isolated as a cholera-eradication test area. As in Canada, no living vaccine, modified or virulent, should be used and no uncooked garbage should be fed. An adequate reserve of serum and of trained personnel should be available to aid in quickly eradicating cholera, should it appear. Perhaps, for the first year, all swine in the area should be vaccinated with inactivated virus but after that no vaccinating should be allowed.

It is regrettable that an area containing only susceptible swine was not set up in the hog cholera-eradication pilot area in Florida, the operation recommended by the U. S. Livestock Sanitary Association.

Obviously, we can not know whether cholera can be eradicated from an area until such an attempt is made. If noneradicable reservoirs for the virus should be found in certain areas, the disease at least should be limitable to those areas.

ABSTRACTS

Air-Borne Transmissible Gastroenteritis

Transmissible gastroenteritis is a highly infectious disease of the intestinal tract of baby pigs. This experiment revealed that the virus was air-borne for distances of 23 and 42 inches at air velocities of 15 and 52 cubic feet per minute. The infectious material apparently became air-borne at the time of the initial appearance of vomitus or diarrhea. Incubation periods for 4- or 6-day-old Hampshire pigs varied from 18 to 24 hours.—[*Elwood F. Reber: Air-Borne Transmissible Gastroenteritis. Am. J. Vet. Res., 17, (April, 1956): 194-195.*]

Effects of Pituitary Growth Hormone Preparations on Swine

The pathological effects of the intramuscular administration of anterior pituitary growth hormone to swine are described. Characteristic lesions include enlargement of the kidneys with albuminous and fatty degeneration and sloughing of the tubular epithelium. The livers were fatty and edematous. The heart was enlarged and the valves showed edematous thickening. Thyroid hypertrophy, pancreatic edema, and dissociation of the adrenal reticularis were common. Generalized edema was characteristic. Common symptoms prior to death were an abrupt cessation of food intake and clonic muscular convulsions.—[*L. P. Doyle, E. J. Turman, and F. N. Andrews: Some Pathological Effects of Anterior Pituitary Growth Hormone Preparations on Swine. Am. J. Vet. Res., 17, (April, 1956): 174-178.*]

FOREIGN ABSTRACTS

Immunization of Sheep Against Clostridium Perfringens

Enterotoxemia may be caused by several types of *Clostridium perfringens*. In the spring when sheep are placed on green pasture after dry winter feeding, the causative agent is usually type C. In late spring when the ration is high in carbohydrates, type D is commonly found. Some strains of type B produce the *epsilon* factor, others do not.

A study of anacultures prepared from types B and C, and mixtures of these anacultures, showed that type C strains produced the most potent immunizing agents. Autogenetic vaccines proved more successful than other types.

Immunization of sheep with anacultures showed that the injection produced serum titers of 1 to 7 units per cubic centimeter; a second injection, 21 days later, increased the titers to 16 and 43 units. This immunity was solid for three months.

A vaccine containing all toxic factors protected sheep against lamb dysentery and all types of enterotoxemia.—[*R. Kattich, V. Dimitrijevitch, E. Mekuli, and P. Kattich (Veterinary Institut of Pristina): A Study of the Immunizing Properties of a Polyvalent Vaccine Against Diseases of Sheep Caused by Microorganisms of the Welchia Perfringens Group. Bull. Off. internat. Epizoot., 43, (1955): 1052-1059.*]—J.P.S.

Agalactia in Nursing Sows

The author found that the lack of certain substances in the diet, such as calcium, phosphorus, and trace elements, played an important part in the nutrition of pigs. This was especially true of pigs kept in pens.

The agalactia of nursing sows always occurred in connection with hypocalcemia. Calcium borogluconate, 30 per cent, proved the best and quickest treatment.—[*P. Wilz: New Information About Agalactia in Nursing Sows. Der Praktische tierärztl., 1, (1956): 8.*]—F.K.

BOOKS AND REPORTS

Principles of Bacteriology and Immunity, Volumes I and II

This is a colossal, two-volume edition of 2,331 pages of which 96 are index and 270 bibliographic references. An average reader would require 14 days of ten hours each to complete its reading. The work is divided into four general sections—general bacteriology, systematic bacteriology, infection and resistance, and application to medicine and hygiene.

The revision of the original text, after a lapse of nine years, indicates the intense activity in most fields of bacteriology. While the book was originally intended for students of medicine and biology, it is apparent and admitted by the authors that such a claim can no longer be justified; but for the postgraduate student of veterinary and human medicine and the research worker, there could be no work of greater value.—[*Principles of Bacteriology and Immunity. By G. S. Wilson and A. A. Miles. Williams and Wilkins Company, Baltimore, Md. 1955. Price not given.*]—CHARLES MURRAY.

Additions to Pet Dog Book Series

Books on four more breeds have been added to the pet dog book series published by the All-Pets Books, Inc. They are "Pet Dalmation" by Evelyn S. Nelson; "Pet German Shorthaired Pointer" by Richard S. Johns; "Pet Miniature Schnauzer" by Marie Slattery; and "Pet Pug" by Filomena Doherty.

These inexpensive, paper-bound books are, like their 21 predecessors, written by outstanding breeders, exhibitors, and veterinarians. Each is written in the layman's language and is designed for the average pet owner. The material covered includes selection of a puppy, care from puppyhood to old age, training, showing, breeding, and history. In addition, there is a chapter on health written by a veterinarian.—[*All-Pets Books, Inc., P.O. Box 151, Fond du Lac, Wis. 1956. Price $1.00 each.*]—TED KJELLSTROM.

THE NEWS

International Associations of "Veterinary Specialists" Being Formed—Affiliation with the International Congress Approved

Considerable interest has developed in the past two years in the formation of international groups of so-called "veterinary specialists," e.g., parasitologists, pathologists, food hygienists, zootechnists, and others. One of the most recent groups to organize is the poultry pathologists.

The main purpose of such specialist associations is to encourage closer contact and collaboration between veterinarians working in the same field and to bring about better understanding and agreement on such matters as nomenclature and methods of diagnosis. It is also believed that such associations should have some sort of affiliation with the International Veterinary Congress and that, through consultation with the Congress authorities, they should take some part in arranging the scientific programs in the respective sections of each International Veterinary Congress. This would have the advantage of grouping or concentrating program subject matter and reports in certain fields of interest in I.V.C. section meetings.

Early in 1955, following proposals made by a few specialist groups to the Permanent Committee of the I.V.C., it was determined that provisional amendments to the statutes should be adopted whereby the international associations of veterinary specialists would be permitted to affiliate. To date, the following have applied to the Permanent Committee:

- International Association of Veterinary Pathologists
- International Association of Poultry Pathologists
- International Society of Veterinary Parasitologists
- International Veterinary Federation of Zootechnics
- International Association of Veterinary Food Hygiene
- International Association of Small Animal Specialists

Although these international veterinary specialist groups may meet only during the course of an international veterinary congress, presumably at the same time and place, it is thought that some of the national specialty groups will meet more frequently, that is, during the meetings of their respective national veterinary associations, e.g., the American College of Veterinary Pathologists and the American Board of Veterinary Public Health hold their annual meetings during the AVMA convention.

Most of the international groups named above have named provisional or interim officers. Professor A. Hjarre (Stockholm) has been selected as interim president of the International Association of Veterinary Pathologists; Dr. L. de Blieck (Holland) and Dr. R. F. Gordon (England) are provisional president and secretary, respectively, of the poultry pathologist's group; and Prof. A. de Vuyst (Belgium) is president of the veterinary zootechnics federation. The provisional president of the small animal specialists is Mr. S. F. J. Hodgman (England) and the secretary pro tem. is W. Brian Singleton, M.R.C.V.S., of the Canine Research Station, Kennett, Suffolk, England.

In the case of the poultry pathologists, Dr. Gordon requests that any existing national association get in touch with him with respect to the formation of an international association; his address is c/o Houghton Poultry Research Station, Houghton Grange, Huntingdon, England.

Commissions Available in Public Health Service

Dr. Leonard A. Scheele, the Surgeon General of the U. S. Public Health Service, announced that qualified veterinarians and other professional health personnel actively engaged in public health practice and preventive medicine are encouraged to apply for commissions in the Commissioned Reserve, which is being expanded to meet the unusual public health demands in national emergencies.

Commissioned Reserve officers will be called for emergency duty primarily to reinforce the staffs of official state and local health agencies and to augment the Public Health Service operating staff; no Reserve officers will be called to emergency active duty, with the exception of volunteers, unless the situation is publicly recognized as requiring such action.

All who are interested are invited to write to the Surgeon General, Public Health Service (DP), Washington 25, D. C.

Openings for Veterinary Meat Inspectors in Hawaii

The Department of Civil Service, Territory of Hawaii, announces recruitment for two positions, one as veterinary meat inspector, class II, at $480 per month, the other as veterinary meat inspector, class I, at $412 per month. Class II requires two years' experience as a practitioner or in a meat inspection program. Class I eligibility is possession of a degree from a recognized veterinary medical school; applications for this appointment will be accepted from veterinary students in their final year.

These positions are in the Territorial Government's long-range meat inspection and disease control program. Benefits include 15 days' annual leave, 15 days' annual sick leave, approximately 15 holidays, civil service status, promotional opportunities, and an appealing climate.

Interested persons should write to Mr. Norman Sharpless, Personnel Examining Execu-

tive, Department of Civil Service, 825 Mililani St., Honolulu 13, T. H.

U. S. GOVERNMENT

Veterinary Personnel Changes.—The following changes in the force of veterinarians in the U.S.D.A., Agricultural Research Service, are reported as of March 31, 1956:

TRANSFERS

Dalys L. Berry, from Fort Worth, Texas, to Indianapolis, Ind.
Carl E. Boyd, from Columbus, Ohio, to Richmond, Va.
William O. Caplinger, from Washington, D.C., to Philadelphia, Pa.
Fred W. Cardwell, from Little Rock, Ark., to Smithfield, Va.
James M. Fancher, from Harrisburg, Pa., to Augusta, Maine.
Joseph Foster, from Albany, N. Y., to Cleveland, Ohio.
Abner K. Kuttler, from Washington, D.C., to Salt Lake City, Utah.
Ernest V. Maginnis, from El Paso, Texas, to St. Louis, Mo.
Leo M. Marshall, from Los Angeles, Calif., to San Diego, Calif.
George W. Moreland, from Fort Worth, Texas, to El Paso, Texas.
Philip G. Papish, from Olympia, Wash., to Seattle, Wash.
Robert L. Pyles, from Jefferson City, Mo., to Pierre, S. Dak.

RETIREMENTS

Harrison W. Butz, Cincinnati, Ohio.
James Eugene Dwyer, San Diego, Calif.
H. Sydnor Miller, Richmond, Va.
Charles E. Mootz, Philadelphia, Pa.
Clyde R. Quillin, Richmond, Va.
Frank E. Theobald, Dayton, Ohio.
Israel Wallman, Chicago, Ill.

AMONG THE STATES AND PROVINCES

Alabama

Central Association.—The March 1 meeting of the Central Alabama Veterinary Medical Association was held in the Maxwell Officers' Club, with Dr. Neil G. MacEachern, president, presiding. Mr. A. W. Todd, commissioner of agriculture, spoke on agriculture and industry in Alabama—how it has changed in recent years and some of the programs he hopes to complete while he is in office. Dr. George Kenmore, chairman of the ethics committee, gave an interesting report on that committee's activities. Dr. Robert Hummer, Montgomery, presented final plans for the meeting of the state association which was held in Montgomery on March 18-20.

s/JOE T. WILLIAMS.

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Dr. Gibbons Receives Zeta Award.—Dr. Walter J. Gibbons (COR '25), professor of large animal surgery and medicine, Alabama Polytechnic Institute, recently received the 1956 Zeta Award from the Zeta Chapter of Omega Tau Sigma, professional veterinary fraternity.

The Award is presented annually to the man who, in the opinion of chapter members, has made the most outstanding contribution in the United States to veterinary science or related fields. Dr. Gibbons is regarded by his colleagues as one of the outstanding diagnosticians in the United States. He has been associated

Dr. Gibbons (center) receives the Zeta Award from Dr. William Jeter, president of the Chapter. Dr. T. C. Fitzgerald (left) is faculty advisor.

with the United Nations Committee of Research Workers on Sterility, has written numerous articles and books, and has conducted research on acetonemia in cattle, sterility, and diseases of the bull.

Dr. Gibbons is a member of the AVMA, Phi Kappa Phi, Phi Zeta, Sigma Xi, and Omega Tau Sigma. He has been head of the Department of Large Animal Surgery and Medicine since 1947.

Colorado

New Society Formed by Federal Veterinarians.—The Colorado Veterinary Medical Association acted favorably, at its meeting in Fort Collins in February, on a petition by the Mile High Chapter of Federal Veterinarians to include that group as a new constituent society of the Colorado V.M.A. This group consists of all federally employed veterinarians in Colorado—ARS, Army, and Air Force—and will be known as District Eleven, Society of Federal Veterinarians, Mile High Chapter.

Since 1950, when the ten societies were formed on a geographical basis, the Colorado Veterinary Medical Association has never had a variance in their constituent organizations. While the new society is not of a geographical nature, it is thought that considerable benefit can be derived by a closer liaison between the new group and the parent organization. Effective immediately, District Eleven will be accorded voting representation on the Board of Control.

s/G. H. GILBERT, *Secretary, State Association.*

Ex Officio Members on Board of State Association.—With the adoption of amendments to the constitution and bylaws, the dean of the School of Veterinary Medicine at Colorado A. & M. College and the editor of the *Rocky Mountain Veterinarian* were granted *ex officio* status on the Board of Control of the Colorado Veterinary Medical Association. The offices of state veterinarian and public health veterinarian have, heretofore, been the only *ex officio* representation. These offices are now held by Drs. Floyd Cross (dean), R. K. Anderson (editor, *Rocky Mountain Veterinarian*), John Childs (state veterinarian), and Martin Baum (public health veterinarian).

s/G. H. GILBERT, *Secretary, State Association.*

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Attorney to Help Revise Practice Act.—State Senator Donald Brotzman, leading Colorado legislator, has been retained by the Colorado Veterinary Medical Association to assist in revising the practice act passed in 1953. Senator Brotzman reviewed this Act before the general membership meeting in February and pointed out the few discrepancies and the recommendations of the Colorado Bar Association.

Dr. N. J. Miller, also a state senator, lauded Senator Brotzman for his efforts on behalf of the veterinary profession in Colorado.

s/G. H. GILBERT, *Secretary, State Association.*

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Death of Mrs. Carroll.— Mrs. A. N. Carroll, wife of Dr. A. N. Carroll of Pueblo, died Feb. 10, 1956. She is survived by her husband, a long-time practitioner of the Pueblo area and recently resigned member of the State Board of Veterinary Medicine; a daughter; and a son, Dr. W. D. Carroll, who is associated with his father in general practice.

s/G. H. GILBERT, *Secretary, State Association.*

Connecticut

State Association.—The annual meeting of the Connecticut Veterinary Medical Association was held in the Hotel Bond, Hartford, on Feb. 1, 1956. The program included the following speakers and their subjects: A. I. Stern, Waterbury (radiation protection in small animal hospitals); John T. McGrath, associate professor of veterinary pathology, University of Pennsylvania, Philadelphia (intracranial pathology, and a film, "Friend of a Friend," from the Gaines Dog Research Center, New York City).

The following officers were elected: Joseph DeVita, New Haven, president; Alvin R. MacDonald, Bloomfield, first vice-president; C. Earl Guthrie, Wilton, second vice-president; and E. H. Patchen, Milford, secretary-treasurer. Dr. W. R. Leggett, Westport, was elected chairman of the executive board; and G. Leroy Cheney, East River, was elected to a three-year term on the board. The following will serve on the board of censors: A. I. Stern, chairman; R. A. Rands, Stamford; J. B. Stewart, Meriden; Frank Ferrigno, Willimantic; and D. H. Ducor, Farmington. Dr. N. W. Pieper, Middletown, was nominated for resident secretary to the AVMA.

s/E. H. PATCHEN, *Executive Secretary.*

District of Columbia

District Association.—The first quarterly meeting of the District of Columbia Veterinary Medical Association was held Jan. 10, 1956, at Walter Reed Army Institute of Research (formerly Army Medical Service Graduate School).

The following were elected to office for the 1956 session: I. G. Cashell, president; C. L. Gooding, first vice-president; Brig. Gen. E. W. Young, second vice-president; and Charles G. Durbin, secretary-treasurer.

The speakers were: Martin Forbes of the Germ-Free Animal Unit of the University of Pennsylvania at Walter Reed Medical Center (research with germ-free animals); and Lt. Col. Fred D. Maurer of the Veterinary Corps, U. S. Army (feline pneumonitis—its recognition and diagnosis).

At the second quarterly meeting on March 13, the following panel members presented a discussion on "Biological Products—Laws and Regulations Pertaining to Their Production, Licensing, Testing, and Their Use by the Practitioners": J. M. Hejl, chief, Biological Products Licensing Section, Animal Inspection and Quarantine Branch, ARS, U.S.D.A.; S. L. Tellejohn, chief, Biological Products Inspection Section, Animal Inspection and Quarantine Branch, ARS, U.S.D.A.; and Jean S. Goudy, practitioner in the District of Columbia.

s/CHARLES G. DURBIN, *Secretary.*

Illinois

Eastern Association.—The spring meeting of the Eastern Illinois Veterinary Medical Association was held at the Hotel Tilden-Hall, Champaign, on March 1, 1956. Dinner was served to 62 members and guests.

Dr. D. E. Ward, Hoopeston, presided over the meeting. Dr. R. W. Kennedy, Colfax, introduced the speaker of the evening, Dr. P. D. Beamer, College of Veterinary Medicine, University of Illinois, who gave an illustrated and informative discussion on the diseases of cattle associated with mucosal lesions.

The Association's all-day clinic will be held on May 24, 1956, in the new Large Animal Clinic Building at the University of Illinois in Urbana. It will be followed by an evening banquet honoring Dean Robert Graham.

s/H. S. BRYAN, *Secretary.*

Indiana

Central Association.—The new officers of the Central Indiana Veterinary Medical Association are: George R. Burch, New Augusta, president; John W. Templeton, McCordsville, vice-president; and Peter Johnson, Jr., Indianapolis, secretary.

s/PETER JOHNSON, JR., *Secretary.*

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Ninth District Association.—At the February 17 meeting of the Ninth District (Ind.) Veterinary Medical Association in Seymour, the following officers were elected: George W. Davis, Franklin, president; and W. A. Brown, Seymour, vice-president and secretary-treasurer.

The program was a discussion of minimum prices.

s/J. L. KIXMILLER, *Resident Secretary.*

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Northeastern Association.—At the March 13 meeting of the Northeastern Indiana Veterinary Medical Association, Dr. B. V. Allen reported on the Chicago meeting of the AVMA Executive Board, District III (representatives from Indiana, Illinois, and Wisconsin). The advantage of preparing papers to be presented at conventions well before time for presentation was brought out.

The women enjoyed a floral arrangement demonstration.

s/J. L. KIXMILLER, *Resident Secretary.*

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Sixth District Association.—The quarterly meeting of the Sixth District Veterinary Medical Association was held at the Ulen Country Club in Lebanon on March 14. Dr. R. F. Baker, Spencerville, Ohio, spoke on current swine problems and showed some slides on which he commented.

s/J. L. KIXMILLER, *Resident Secretary.*

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Tenth District Association.—The Tenth District (Ind.) Veterinary Medical Association met in Greenfield on March 15. This dinner meeting was arranged in honor of Dr. C. P. Wilson, Indianapolis, who formerly was a resident of Greenfield. He entered the first class in the old Indiana Veterinary College, graduated in 1895, and has been in general practice in this area ever since.

s/J. L. KIXMILLER, *Resident Secretary.*

Kentucky

Central Association.—The Central Kentucky Veterinary Medical Association holds regularly scheduled meetings the first Wednesday of every month. Their officers are: Harley H. Sutton, Lexington, president; and L. S. Shirrell, Frankfort, secretary.

s/JOHN W. FINLAY.

Missouri

Kansas City Association.—The March 20 meeting of the Kansas City Veterinary Medical Association met in two groups—one heard Dr. Louis T. Dawe, Capac, Mich., discuss dairy practice; the other group was addressed by Dr. E. R. Price, U. S. Public Health Service, Jefferson City, on rabies and its public health significance.

s/BUSCH MEREDITH, *Secretary.*

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Dr. Jones Chosen Veterinarian of the Year.—Dr. J. L. Jones, Blackburn, was chosen by the Missouri Veterinary Medical Association for their annual Veterinarian of the Year Award. Dr. Jones, who has practiced in Blackburn for 41 years, is past-president of the Missouri State and Kansas City Veterinary Medical Associations, a charter member of the Central Missouri V.M.A., and is also a member of the AVMA. He was appointed for two terms to the Missouri State Veterinary Examining Board; served in the state legislature as representative from Saline County; was mayor of Blackburn for ten years; was a member of his school board; served on the Blackburn road district; and was general chairman of the annual Blackburn Fall Festival for a number of years. He is now serving as assistant state veterinarian.

New Jersey

Morris Foundation Continues Support of Cat Nutrition Studies.—The Rutgers University Bureau of Biological Research has announced that continuance of a two-year-old study of the basic nutritional requirements of the cat will be underwritten by a grant of $6,000 from the Mark L. Morris Animal Memorial Foundation of Topeka, Kan. This study was undertaken two years ago under the direction of Drs. James B. Allison and John R. McCoy of the Bureau staff (*see* the JOURNAL, April, 1955: 348). It will be continued by Stanford A. Miller, assistant in physiology and biochemistry at Rutgers.

New York

Morris Foundation Sponsors Study of Aging in Old Dogs.—Cornell University has announced that a study of the aging in old dogs will be conducted in the Department of Pathology and Bacteriology of the veterinary college. The study, which will be conducted by Dr. Roger J. Panciera and supervised by Dr. Charles G. Rickard of the Department staff, will be supported with funds contributed by the Mark L. Morris Animal Memorial Foundation of Topeka, Kan.

Dogs used in the study will be selected by veterinarians in various parts of the country and shipped to Ithaca. In addition to evaluating the special problems of aging in old dogs, an attempt will be made to determine whether dogs age at the same rate and in the same way in widely separated parts of the country.

Pennsylvania

Keystone Association.—The program of the monthly meeting of the Keystone V.M.A., held at the University veterinary school on the evening of March 28, 1956, was a panel discussion on roentgenology with audience participation along the lines of "What Is Your Diagnosis?" in the AVMA JOURNAL. Selected radiographs were shown and discussed by members of the veterinary faculty. Guest panelist was George R. Pechstein, M.D., radiologist of Pottstown Hospital and consulting radiologist at Pennsylvania Hospital.

s/R. C. SNYDER, *Secretary.*

Quebec

Veterinary Medical Congress Planned.—The Canadian Veterinary Association and the Veterinary College of the Province of Quebec will hold their annual joint congress on July 19-21 at the Sheraton-Mont Royal Hotel in Montreal.

The subject of this congress will be "The Part of Veterinary Medicine in Animal Industry." Prominent speakers have been invited and a delegation of outstanding European visitors, representing the National Syndicate of French Veterinarians and French and Belgian veterinary colleges, will participate in the scientific sessions.

s/JACQUES ST. GEORGES, *Publicity Committee.*

Virginia

State Association.—The fifty-ninth annual meeting of the Virginia Veterinary Medical Association, held Jan. 22-24, 1956, had a total registration of 153 members and guests. Nine new members were elected to active membership, and Dr. H. S. Miller, Richmond, Va., was elected to life membership. At the Association's banquet, Dr. Miller, who retired as federal inspector in charge on Feb. 1, 1956, was presented a gift in recognition of his many years of service to the state and the Association.

The officers elected for 1956 were: J. E. Lippincott, Lynnhaven, president; J. B. Ely, Richmond, president-elect; A. W. Rice, Roanoke, vice-president; W. B. Bell, Blacksburg, secretary-treasurer; and to the board of directors—G. H. Brumble, Fredricksburg; E. E. Thompson, Salem; and I. I. Franklin, Arlington.

s/WILSON B. BELL, *Resident Secretary.*

STATE BOARD EXAMINATIONS

Iowa—The Iowa Veterinary Medical Examining Board will hold examinations for the licensing of veterinarians on Monday and Tuesday, June 11-12, 1956. Applicants are asked to be in the office of the Division of Animal Industry, State House, Des Moines, not later than 8:00 a.m. on June 11. Anyone wishing to obtain further information should communicate with Dr. H. U. Garrett, chief, Division of Animal Industry, State House, Des Moines 19, Iowa.

Massachusetts—The Massachusetts Board of Registration in Veterinary Medicine will hold examinations for registration in this state on June 28, 29, and 30, 1956, at Amherst. The latest date for filing applications is June 15, 1956. Address inquiries to Dr. Ray S. Youmans, secretary, Board of Registration in Veterinary Medicine, Room 33, State House, Boston, Mass.

VETERINARY MILITARY SERVICE

Colonel Betzold Attends European Conference.—Colonel Curtis W. Betzold, Veterinary Division, Office of the Army Surgeon General, participated in the Joint Army-Air Force Veterinary Conference held in Landstuhl, Germany, on April 19-20, for veterinary officers stationed in Europe.

He reported to the European conferees on the recent veterinary developments affecting food inspection for the Armed Forces and also discussed the activities of the Veterinary Division, Office of the Surgeon General.

Before his return to this country on April 22, Colonel Betzold made official visits to Holland, Denmark, and France.

DEATHS

★**William Albright** (TH '16), 63, Colfax, Ind., died Oct. 11, 1955. Dr. Albright was admitted to the AVMA in 1918. He is survived by his widow.

★**J. Leonard Axby** (CVC '03), 80, Indianapolis, Ind., one-time state veterinarian of Indiana, former AVMA Executive Board member, and prominent practitioner for many years, died on April 17, 1956. A more complete obituary will appear in a later issue of the JOURNAL.

★**Frederic L. Bailey** (COL '50), 39, La Mesa, Calif., died Jan. 14, 1956. Dr. Bailey was a general practitioner and was admitted to the AVMA in 1950. He is survived by his widow.

★**Lynce C. Bowling** (ISC '20), 62, Los Angeles, Calif., died Feb. 26, 1956. Dr. Bowling, who had served with the ARS, U. S. Department of Agriculture, was admitted to the AVMA in 1952. He is survived by his widow.

★**Frank Hurlbut** (SF '18), 70, Yellville, Ark., died Jan. 28, 1956. Dr. Hurlbut had served with the Bureau of Animal Industry, U. S. Department of Agriculture. He was admitted to the AVMA in 1919. His widow and a daughter survive.

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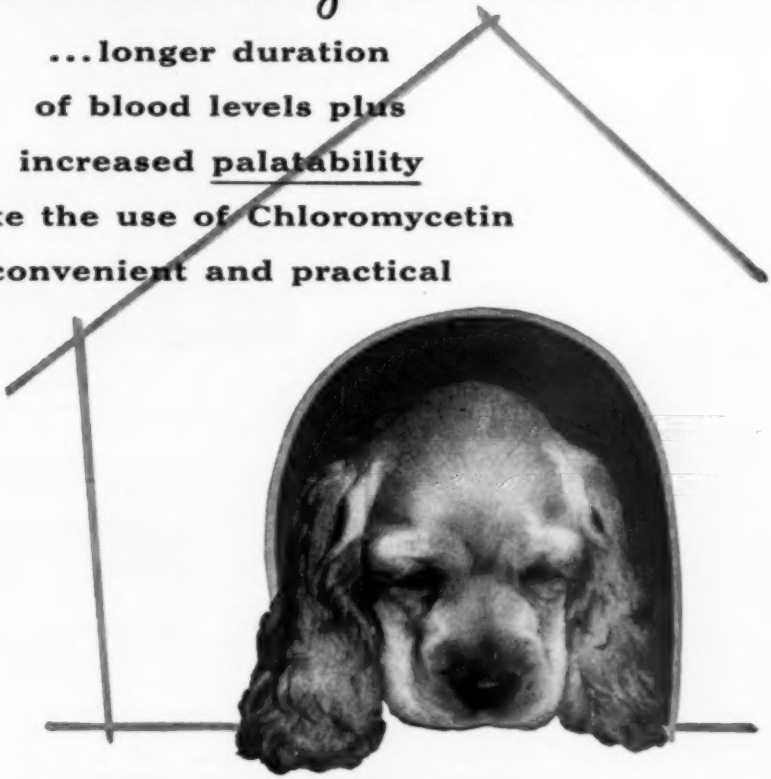

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PROFESSIONAL LITERATURE AVAILABLE ON REQUEST

Department of Veterinary Medicine
PARKE, DAVIS & COMPANY
Detroit 32, Michigan

ORGANIZATION SECTION

WOMEN'S AUXILIARY

President—Mrs. Earl N. Moore, 636 Beall Ave., Wooster, Ohio.
Secretary—Mrs. F. R. Booth, 3920 E. Jackson Blvd., Elkhart, Ind.

How Members Can Best Serve Local Auxiliaries.—The local auxiliaries are the foundation on which the national organization is built. It is usually through them that future leaders are developed. Strong local groups make for strong state and national organizations, just as strong local leaders are potential officers for the state auxiliaries and the Women's Auxiliary to the AVMA.

First of all, a good member attends her local meetings, thus assuring her husband as well as her community that she believes in him and his profession.

She is friendly with other members, especially new women in her auxiliary. She makes an effort to know by name all who attend regularly and to meet and welcome visitors and those who attend occasionally.

The older woman makes the young woman feel needed and wanted. She learns her first name and calls her by it, inquires where her husband is located in his work, how many children in the family, and the schools that she and her husband attended. She is a good listener when the young wife talks of her daily problems—babies, curtains for the house, and helping her husband get started.

The young woman can inspire her auxiliary by her eagerness, confidence, and youth. What she lacks in experience is made up in enthusiasm.

If she is asked to serve on a committee, she does so if she possibly can, for she knows her officers need cooperation and support from every member.

Sometime during her career as the wife of a veterinarian, the auxiliary member takes her turn at serving as an officer or she may go through the line from lowest officer to president if her auxiliary prefers that method. The important point is that she learns by doing.

A good member is an informed member, so she serves her local group best if she knows what her own organization is doing, as well as being familiar with the framework of her state auxiliary and the Women's Auxiliary to the AVMA.

Last, but not least, she can serve her local auxiliary best by paying dues not only in her local group but also the state and national dues, thus supporting them financially. It is through the Student Loan Fund of the Women's Auxiliary to the AVMA, whose source is annual dues, that a member reaches the very heart of her organization.

s/Mrs. Glen L. Dunlap, *Kansas City, Mo.*

Michigan Student Chapter Auxiliary.—The wives of upper-class veterinary students at Michigan State University are determined to be more than a smiling asset to their husbands and readily cooperate in a special program of evening classes. The classes this school year ranged from office management to assisting during surgical operations. The excellent plan-

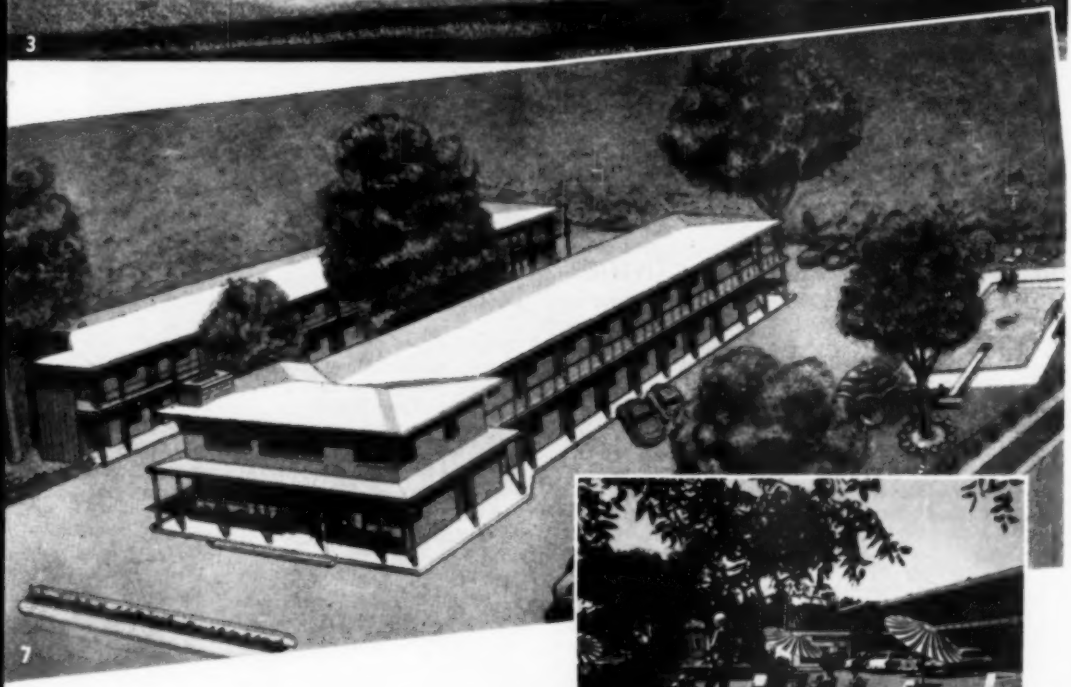
Ralph Haase (center), a senior at M.S.U., performs an operation, under the direction of Dr. Wade O. Brinker, in the special evening classes for seniors and their wives. Mrs. Haase assists her husband.

ning and execution of these educational classes is done by Dr. Wade O. Brinker. Dr. Brinker is supervising eight operations performed each Tuesday evening this term in an eight-table operating room at Giltner Hall on the campus. Alternating senior students perform the operations with their wives as assistants. The remaining wives of all classes are onlookers. In this way, each senior wife is able to assist her husband, and all the club members are able to acquaint themselves with surgical procedures.

The classes for "senior wives," held every Monday evening on laboratory techniques, are progressing with great success. Dr. L. B. Sholl, who conducts these classes, first explains and demonstrates to the wives how to do blood counts, urine tests, and fecal tests; he then supervises the wives as they perform these various techniques.

The new officers elected at the February meeting are: Mrs. Arnold Studer, president; Mrs. Richard Asquith, vice-president; Mrs. Robert Scholtens, secretary; Mrs. Elbridge Dunckel, treasurer; Mrs. John Trotman, publicity chairman; Mrs. W. McQuillan and Mrs. Francis McGrady, social chairmen; Mrs. Dave Roberts and Mrs. Joseph Sundell, junior board members; Mrs. Charles Martin and Mrs. Aron Leash, sophomore board members; Mrs. W.

(Continued on p. 20)



Motels in San Antonio
3 — Belvidere; 7 — Rio Lado; 8 — Western

(WOMEN'S AUXILIARY—*continued from p.* 18)

Davis and Mrs. Dean Tribby, freshmen board members.

The annual Bohemian dinner, sponsored by the auxiliary, was held April 11 and was followed by an evening of square dancing.

"If you have any rummage, bring it along," was often spoken by many of the wives on and before April 21, when the club held its rummage sale. Chests, closets, and hide-away corners were searched to find odds and ends to make the sale a success.

Everyone has a favorite recipe to please the palates of family and friends. The club members and faculty wives are giving up their own precious gems for publication. These recipes are being collected and correlated now for the auxiliary's cookbook which will be published and go on sale this coming fall. Anyone interested in obtaining one should contact Mrs. Peggy Studer, Birch Ave., East Lansing, Mich.

s/Mrs. Ralph Haase.

STUDENT CHAPTER ACTIVITIES

Cornell Chapter.—On Feb. 28, 1956, the Cornell University Student Chapter of the AVMA elected the following officers: Daniel B. Davis, president; Harry Russell, vice-president; Donald Mielke, treasurer; and Alvin Schwartz, secretary.

The guest speaker for the evening was Major Rex Morgan whose subject was hypnosis.

On March 13, Dr. G. Stevens, Groton, N. Y., gave an interesting talk on "Forty Years in Veterinary Medicine."

s/Alvin Schwartz, *Secretary.*

• • •

Michigan Chapter.—The following speakers addressed the Michigan State University Student Chapter of the AVMA recently: Dr. H. C. H. Kernkamp, St. Paul, Minn., "Tips on Swine Practice"; Dr. Roger Brown, "Small Animal Practice"; Dr. R. W. Worley, "The Business Side of Operating a Veterinary Hospital"; and Dr. Richard Snyder, "Cerebral Palsy," and a film on "Subtotal Hemispherectomy."

On Friday, March 9, the School of Veterinary Medicine held its annual medicine ball and dinner.

The following officers were elected to serve during the spring semester: Dick Asquith, president-elect; Pat Prouty, vice-president; Caroline Cartwright, secretary; Don Turner, treasurer; Jack Meister, sergeant-at-arms; and Dr. N. R. Cholvin, faculty advisor.

s/Ellin Abbott, *Retiring Secretary.*

• • •

Ontario Chapter.—The Ontario Veterinary College Student Chapter of the AVMA held its annual banquet on Jan. 31, 1956. The approximately 500 guests present included faculty members, students, and friends.

One of the highlights of the evening was the presentation of the O.V.C. Student Chapter

Dr. J. S. Glover, of the Ontario Veterinary College, presents the O.V.C. Student Chapter Trophy to Mr. Denis O'Connor.

Trophy to Mr. Denis O'Connor, a fourth-year student. The presentation was made by Dr. J. S. Glover of the O.V.C.

Dr. T. Lloyd Jones, principal, introduced the guest speaker, Mr. John Fisher, executive director of the Canadian Tourist Association and a well-known traveler, who gave a very educational and interesting talk about Canada. After the banquet, the guests were invited to attend the O.V.C. "at home," an open house which provides an opportunity for the public to view the different displays and gives an insight to the work carried on by the various departments.

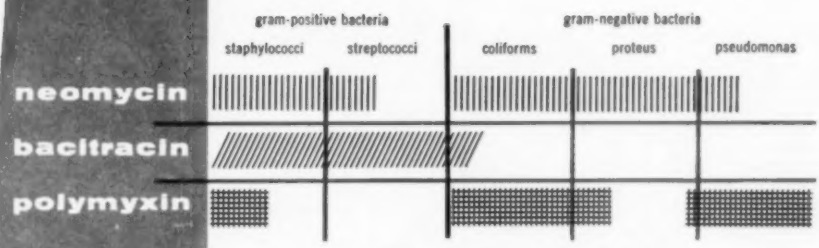
s/C. Fred Rhoads, *Secretary.*

• • •

Texas Chapter.—The first meeting of the Texas A. & M. College Student Chapter of the AVMA was the annual smoker honoring the incoming freshman class. Joe West talked about the Minneapolis convention of the AVMA and introduced the officers for the fall semes-

(*Continued on p.* 22)

THESE ARE ANTIBIOTICS SPECIFICALLY FOR TOPICAL USE...



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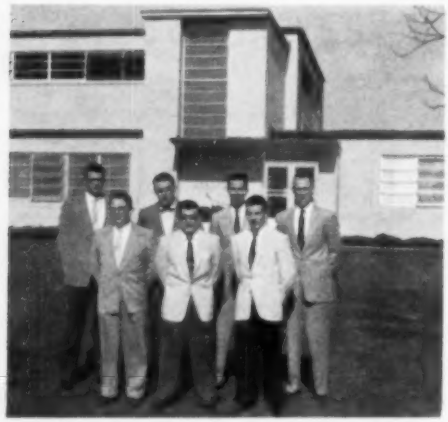
(STUDENT CHAPTER ACTIVITIES—*continued from p. 201*)

ter. Wallace Larson explained the student honor code and Dean W. W. Armistead introduced the faculty.



The officers of the Texas Student Chapter of the AVMA are (front row, left to right)— Virgil Patrick, parliamentarian; Willie Buller, secretary-treasurer; and Roy Chaney, sergeant-at-arms.

Back row—Dick Crawford, reporter; Gerald Van Hoosier, president-elect; Bill Ard, president; and Wallace Kleb, vice-president.

In the background is the new Veterinary Clinic building.

At the regular meetings held the second and fourth Tuesday of each month, outstanding practitioners and research men have addressed the Chapter. Plans have been made for the annual banquet and ball at which approximately 350 are expected.

Since Texas A. & M. is the host school for student delegates to the AVMA convention in San Antonio, October 15-18, the Chapter and its Auxiliary have been engaged in fund-raising activities. Among these projects were a dance and a smorgasbord just prior to the Christmas holidays. We feel honored at being the host school and plan to have the student delegates visit our campus at College Station on Sunday, October 14. On the agenda is a tour of the campus and the veterinary school, followed by the preconvention banquet for delegates on Sunday night. We are looking forward to meeting the student delegates from other veterinary schools and hope that all of them are making plans to stop at College Station on their way to San Antonio.

s/R. P. CRAWFORD, *Reporter.*
BILL ARD, *President.*

APPLICATIONS

Applicants—Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative Bylaws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., the names of applicants residing within the jurisdictional limits of the constituent associations shall be published once in the JOURNAL.

The following applicants have been certified as members of the constituent association that has jurisdiction over the area in which the applicant resides. This certification was made by the secretary of the constituent association in accordance with Section 2, Article X, of the Administrative Bylaws.

MacLENNAN, IAN S.
5732 Post Road, East Greenwich, R. I.
M.R.C.V.S., University of Liverpool, England, 1942.

McKEE, JOE B.
Rt. 11, Box 344, San Antonio, Texas.
D.V.M., Texas A. & M. College, 1943.

MOODY, ROBERT B.
Jackson, Mo.
D.V.M., Kansas State College, 1943.

NIELSEN, SVEND W.
798 Melrose Ave., Columbus, Ohio.
V.S., Royal Veterinary College, Denmark, 1951.

SCHAUB, RICHARD E.
Box 1317, New Carlisle, Ind.
D.V.M., Michigan State University, 1943.

Applicants—Not Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative Bylaws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., notice of all applications from applicants residing outside of the jurisdictional limits of the constituent associations, and members of the Armed Forces, shall be published in the JOURNAL for two successive months. The first notice shall give the applicant's full name, school, and year of graduation, post office address, and the names of his endorsers.

First Listing

ANDERSON, GERALD A.
98th Tactical Hospital, Lincoln Air Force Base, Lincoln, Neb.
D.V.M., Ohio State University, 1950.
Vouchers: W. O. Kester and R. L. Hummer.

GEORGE, RALPH W.
1604 S. Washington Ave., Mobile, Ala.
D.V.M., Texas A. & M. College, 1955.
Vouchers: F. M. Burkey and L. W. Cottle, Jr.

WATSON, WILLIAM H., Jr.
1147 Freemont Drive, Montgomery, Ala.
D.V.M., University of Georgia, 1950.
Vouchers: J. S. Zwiers and J. R. Halstead.

Second Listing

FRIEDRICH, MAJOR L., 4401 Crawford, Houston, Texas.

McCLURE, ROBERT C., Iowa State College, Division of Veterinary Medicine, Ames, Iowa.

SIMON, KAKKASSERIL J., Kakkasseril House, P.O. Kanipayyur, Kunnamkulam, India.

Key to Hotels on Opposite Page

2—Crockett Hotel	5—Robert E. Lee
3—Gunter Hotel	6—St. Anthony
4—Menger Hotel	7—White Plaza

Right-hand Corner—Plaza

2

3

4

Hotels in
San Antonio

5

6

COMING MEETINGS

Eastern Iowa Veterinary Association, Inc. Annual all-day practitioners' clinic. Hawkeye Downs, Cedar Rapids, May 8, 1956. Forrest E. Brutsman, Traer, secretary.

American Animal Hospital Association. Annual meeting. Hotel Fontainebleu, Miami Beach, Fla., May 23-26, 1956. W. H. Riser, 5335 Touhy Ave., Skokie, Ill., executive secretary.

Eastern Illinois Veterinary Medical Association. All-day clinic. Large Animal Clinic Building, University of Illinois, Urbana, May 24, 1956. H. S. Bryan, College of Veterinary Medicine, University of Illinois, secretary.

Wyoming Veterinary Medical Association. Summer meeting. Pinedale, Wyo., June 10-11, 1956. J. J. Ryff, P.O. Box 960, Laramie, secretary.

California State Veterinary Medical Association. Annual meeting. Hotel Statler, Los Angeles, June 10-13, 1956. Charles S. Travers, 3004 16th St., San Francisco, executive secretary.

Georgia Veterinary Medical Association. Fiftieth anniversary meeting. Hotel Oglethorpe, Savannah, June 10-12, 1956. C. C. Rife, 505 Lindberg Dr., N.E., Atlanta 5, secretary.

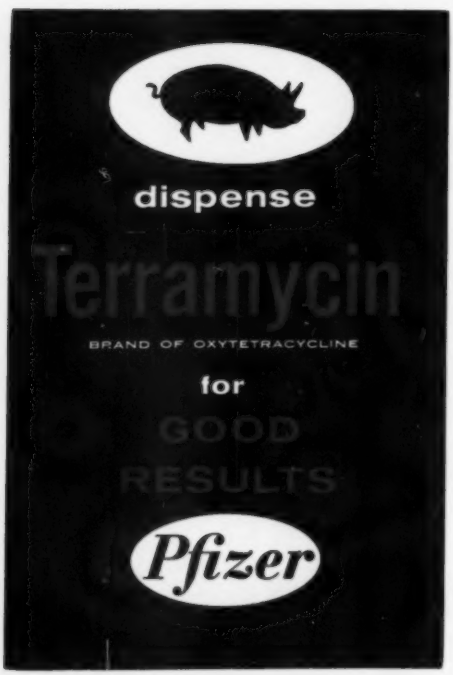
Ohio State University. Conference for veterinarians. Union Building, Ohio State University, Columbus, June 13-14, 1956. John H. Helwig, chairman.

Montana Veterinary Medical Association. Summer meeting. Livingston, Mont., June 13-15, 1956. G. A. Morrison, 916 Central Ave., Great Falls, secretary.

Idaho Veterinary Medical Association. Summer meeting. Salmon, Idaho, June 18-20, 1956. A. P. Schneider, 3025 N. Twenty-Third St., Boise, secretary.

Michigan State Veterinary Medical Association. Annual meeting. Bancroft Hotel, Saginaw, June 21-22, 1956. Paul V. Howard, 4011 Hungsberger, N.E., Grand Rapids, secretary.

Vermont Veterinary Medical Association. Annual summer conference. The Lodge at Smuggler's Notch, Stowe, June 21-22, 1956. A. E. Janawicz, Department of Agriculture, Montpelier, secretary.



Utah State Veterinary Medical Association. Summer meeting. Provo, Utah, June 21-22, 1956. B. N. Horstman, 3685 Riverdale Rd., Ogden, secretary.

Alberta Veterinary Association. Annual meeting. Edmonton, Alta., June 22-23, 1956. C. H. Bigland, 10988 Seventy-Fourth Ave., Edmonton, chairman, convention committee.

North Dakota Veterinary Medical Association. Annual meeting. Jamestown, N. Dak., June 25-26, 1956. Dean Flagg, 202 Teton Ave., Bismarck, secretary.

North Carolina Veterinary Medical Association. Annual meeting. Greensboro, N. Car., June 25-27, 1956. Martin P. Hines, Raleigh, executive committee.

University of Wisconsin. Annual veterinary conference. University of Wisconsin, Madison, June 26-27, 1956 C. H. Brandly, head, Department of Veterinary Science.

Maritime Veterinary Associations. Annual joint conference. Mount Allison University, Sackville, N. B., June 26-28, 1956. J. F. Frank, P.O. Box 310, Sackville, chairman.

Maryland State Veterinary Medical Association. Annual summer meeting. George Washington Hotel, Ocean City, Md., June 28-29, 1956. John D. Gadd, Cockeysville, Md., secretary.

Pacific Northwest Veterinary Medical Association (British Columbia, Oregon, Washington). Annual meeting. Vancouver, B. C., June 28-30, 1956. P. L. Stovell, 3187 W. Forty-Third Ave., Vancouver, coordinator.

South Carolina Association of Veterinarians. Summer meeting. Clemson House, Clemson College, S. Car., June 28-30, 1956. B. C. McLean, P. O. Box 432, Aiken, program chairman.

Mississippi State Veterinary Association. Annual meeting. Buena Vista Hotel, Biloxi, July 15-17, 1956. Harvey F. McCrory, P.O. Box 536, State College, secretary.

Iowa State College. Annual conference for veterinarians. Memorial Union, Iowa State College, Ames, July 17-18, 1956. John B. Herrick, Iowa State College, Ames, co-chairman of conference.

Virginia Veterinary Medical Association. Summer meeting. Natural Bridge Hotel, Natural Bridge, July 17-19, 1956. Wilson B. Bell, 1303 Hillcrest Dr., Blacksburg, secretary.

Canadian Veterinary Association and the College of Veterinary Medicine of the Province of Quebec. Annual joint congress. Sheraton-Mont Royal Hotel, Montreal, July 19-21, 1956. Jacques St. Georges, publicity committee.

Alabama Polytechnic Institute. Annual conference for veterinarians. School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, Ala., July 22-25, 1956. R. S. Sugg, dean.

Colorado Veterinary Medical Association. Annual meeting. Estes Park, Sept. 7-9, 1956. G. H. Gilbert, 5500 Wadsworth Blvd. Arvada, Colo., secretary.

Pennsylvania State Veterinary Medical Association. Annual meeting. Bedford Springs Hotel, Bedford, Pa., Sept. 12-14, 1956. Raymond C. Snyder, N.W. Corner Walnut St., and Copley Rd., Upper Darby, Pa., secretary.

New York State Veterinary Medical Society, Annual meeting. Concord Hotel, Kiamesha Lake, N. Y., Sept. 19-21, 1956. L. W. Goodman, 2303 Northern Blvd., Manhasset, general chairman; Miss Joan S. Halat, 803 Varick St., Utica, secretary.

Washington State Veterinary Medical Association. Annual meeting. Davenport Hotel, Spokane, Sept. 21-22, 1956. P. J. Pfarr, 6306 N. Wall St., Spokane 53, general chairman.

Oklahoma conference for veterinarians. School of Veterinary Medicine, Oklahoma A. & M. College, Stillwater, Sept. 27-28, 1956. A. L. Malle, Department of Veterinary Pathology, chairman.

Eastern Iowa Veterinary Association, Inc. Annual meeting. Hotel Montrose, Cedar Rapids, Oct. 4-5, 1956. Forrest E. Brutsman, Traer, secretary.

(*Continued on p. 26*)

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We would like to discuss good ingredients for good dog foods.

PEDRICK LABORATORIES

C. Pedrick, D.V.M.

Sand Springs, Okla.

(COMING MEETINGS—*continued from p. 24*)

American Veterinary Medical Association. Annual meeting. Municipal Auditorium, San Antonio, Texas, Oct. 15-18, 1956. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

U. S. Livestock Sanitary Association. Annual meeting. Morrison Hotel, Chicago, Ill., Nov. 28-30, 1956. R. A. Hendershott, 33 Oak Lane, Trenton 8, N. J., secretary.

Nebraska Veterinary Medical Association. Annual meeting. Hotel Lincoln, Lincoln, Dec. 3-5, 1956. W. T. Spencer, 1250 North 37th St., Lincoln, secretary.

Foreign Meetings

World Congress on Fertility and Sterility. Naples, Italy, May 18-26, 1956. Professor T. Bonadonna, Via Monte Ortigara, 35, Milan, Italy, in charge of Veterinary Section.

Third International Congress on Animal Reproduction. Arts School, Cambridge University, Cambridge, England, June 25-30, 1956. Dr. Joseph Edwards, Milk Marketing Board, Thames Ditton, Surrey, England, honorary secretary.

Veterinary Conference, Jamaica Branch, British Caribbean Veterinary Association, Jamaica, B.W.I., July 28-Aug. 8, 1956. C. L. Bent, Veterinary Division, Department of Agriculture, Hope, Kingston, Jamaica, B.W.I., hon. secretary.

Tenth International Congress of Entomology. McGill University and University of Montreal, Montreal, Canada, Aug. 17-25, 1956. J. A. Downes, Division of Entomology, Science Service Bldg., Ottawa, Ont., Canada, secretary.

International Association of Hydatidology. Sixth Congress. Athens, Greece, Sept. 14-18, 1956. Prof. B. Kourias, 1 MacKenzie King St., Athens, Greece, general secretary.

(*Continued on p. 28*)

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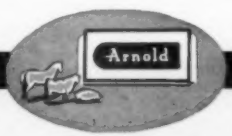

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Vitamin A	2500 Units
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Thiamine Hydrochloride	5 mg.
Riboflavin	1 mg.
Pyridoxine Hydrochloride	1 mg.
Pantothenic Acid	1 mg.
Ascorbic Acid	5 mg.
Niacinamide	5 mg.
Desiccated Liver	0.5 Gm.
Vitamin B_{12}, Crystalline	2 mcgm.
Dicalcium Phosphate	5 Gm.

Plus Amino Acids and Trace Minerals Natural to Brewer's Yeast.

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Diet Supplement for Pregnant or Lactating Animals and those Convalescing from Infectious Disease or Parasites

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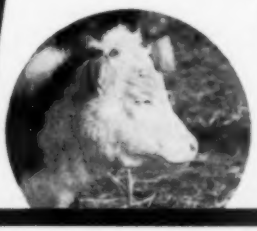

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Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Association, the first Thursday of each month. B. M. Lauderdale, Montgomery, secretary.

Jefferson County Veterinary Medical Association, the second Thursday of each month. W. R. Laster, Jr., 213 N. 15th St., Birmingham, Ala., secretary.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. Keith T. Maddy, Phoenix, Ariz., secretary.

Pima County Veterinary Medical Association, the third Wednesday of each month in Tucson. E. T. Anderson, 8420 Tanque Verde Rd., Tucson, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. E. T. Anderson, Rt. 2, Box 697, Tucson, Ariz., secretary.

CALIFORNIA—Bay Counties Veterinary Medical Association, the second Tuesday of each month. E. Paul, Redwood City, Calif., secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Wilfred Pimentel, 3455 S. Elm Ave., Fresno, Calif., secretary.

East Bay Veterinary Medical Association, bimonthly, the fourth Wednesday. Leo Goldston, 3793 Broadway, Oakland 11, Calif., secretary.

Kern County Veterinary Medical Association, the first Thursday evening of each month. B. C. Watson, 825 14th St., Bakersfield, Calif., secretary.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. W. H. Rockey, P. O. Box 121, San Luis Obispo, Calif., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 90 Corral de Tierra, Salinas, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. Lyle A. Baker, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. Chester A. Maeda, 766 E. Highland Ave., San Bernardino, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month. Donald E. Lind, 2643 N. Main St., Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. T. D. Harris, San Mateo, Calif., secretary.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. Robert E. Clark, Napa, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. W. E. Steinmetz, 4227 Freeport Blvd., Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. H. R. Rossoll, 1795 Moore St., San Diego, Calif., secretary.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. John Chudacoff, 7912 Sepulveda Blvd., Van Nuys, secretary.

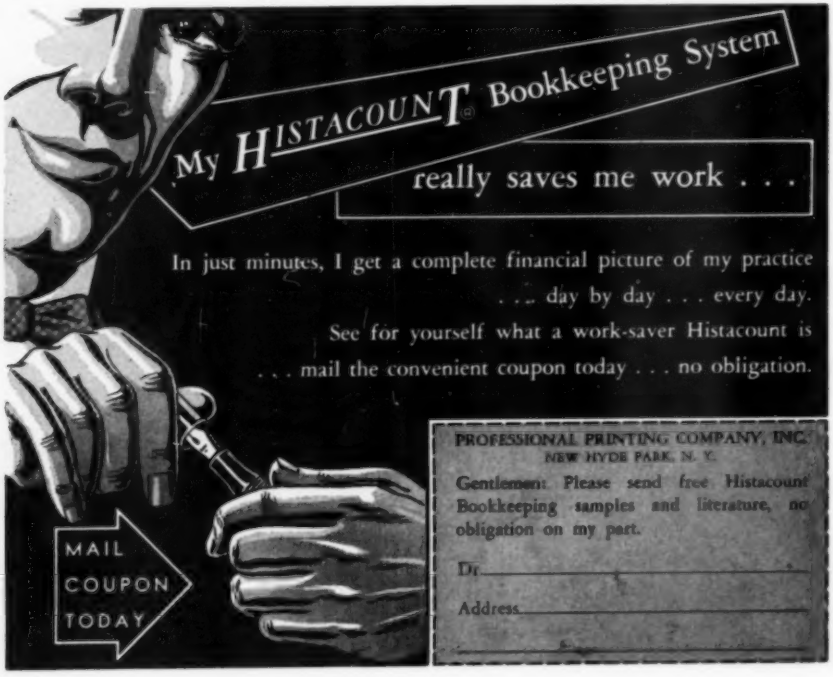
Southern California Veterinary Medical Association, the third Wednesday of each month. Howard C. Taylor, 2811 West Olive St., Burbank, Calif., secretary.

Tulare County Veterinarians, the second Thursday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

COLORADO—Denver Area Veterinary Society, the fourth Tuesday of every month. Richard C. Tolley, 5060 S. Broadway St., Englewood, Colo., secretary.

Northern Colorado Veterinary Medical Society, the first Monday of each month. M. A. Hammarlund, School of

(*Continued on p. 30*)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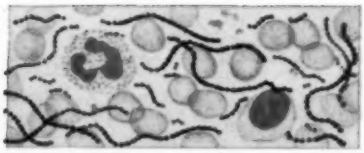

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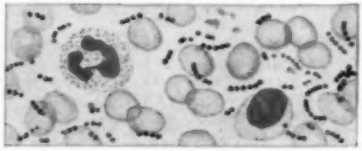
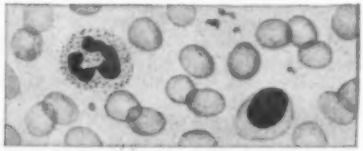


for therapy at the pathogen level



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Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. E. J. Hathaway, Clifton Park Manor, Apt. 73-5, Wilmington 2, Del., secretary.

FLORIDA—Jacksonville Veterinary Medical Association, the second Thursday of each month, time and place specified monthly. George F. Yopp, 4644 Main St., Jacksonville, Fla., Secretary.

Palm Beach Veterinary Society, the last Thursday of each month in the county office building at 810 Datura St., West Palm Beach. Ross E. Evans, 5215 S. Dixie Highway, West Palm Beach, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. Paul J. Myers, Winter Haven, Fla., secretary.

South Florida Veterinary Society, the third Tuesday of each month, at the Seven Seas Restaurant, Miami, Fla. E. D. Stoddard, 6432 S. W. 8th St., Miami, Fla., secretary.

GEORGIA—Atlanta Veterinary Society, the second Tuesday of every month at the Elks Home on Peachtree St., Atlanta, Ga. J. L. Christopher, Smyrna, Ga., secretary.

ILLINOIS—Chicago Veterinary Medical Association, the second Tuesday of each month. Mark E. Davenport, Jr., 215 S. Edgewood Ave., LaGrange, Ill., secretary.

Eastern Illinois Veterinary Medical Association, the first Thursday of March, June, September, and December. A one-day clinic is held in May. H. S. Bryan, College of Veterinary Medicine, University of Illinois, Urbana, secretary.

INDIANA—Central Indiana Veterinary Medical Association, the second Wednesday of each month. Peter Johnson, Jr., 4410 N. Keystone Ave., Indianapolis 5, secretary.

Michiana Veterinary Medical Association, the second Thursday of each month, at the Hotel LaSalle, South Bend, Ind. L. D. Ramsay, 719 E. Jefferson Ave., La Porte, Ind., secretary.

Tenth District Veterinary Medical Association the third Thursday of each month. W. E. Sharp, Union City, Ind., secretary.

IOWA—Cedar Valley Veterinary Association, the second Monday of each month, except January, July, August, and October, at Black's Tea Room, Waterloo, Iowa. D. A. Buchanan, Grundy Center, Iowa, secretary.

Coon Valley Veterinary Association, the second Wednesday of each month, September through May, at the Bradford Hotel, Storm Lake, Iowa. D. I. Lee, Sac City, Iowa, secretary.

Fayette County Veterinary Association, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant, West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. L. S. Shirrell, Versailles Rd., Frankfort, secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month in Louisville or within a radius of 50 miles. W. E. Bewley, P.O. Box "H," Crestwood, secretary.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m. at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Harry L. Schultz, Jr., 9011 Harford Rd., Baltimore, Md., secretary.

MICHIGAN—Mid-State Veterinary Medical Association.

(*Continued on p. 31*)

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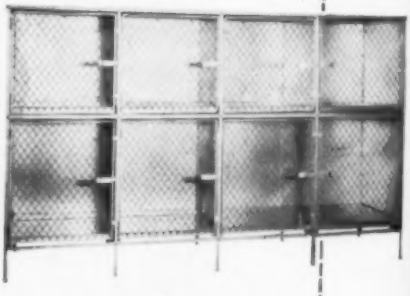

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(COMING MEETINGS—*continued from p. 30*)

the fourth Thursday of each month with the exception of November and December. Robert E. Kader, 5034 Armstrong Rd., Lansing 17, Mich., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. S. Correll, Rt. 1, Midland, Mich., secretary.

Southeastern Veterinary Medical Association, the fourth Wednesday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Rd., Detroit 5, Mich., secretary.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of the month (except July and August) at the Sheraton Hotel, Spring Ave. and Lindell Blvd. Allen B. Shopmaker, 136 N. Meramec, Clayton 5, Mo., secretary.

Kansas City Small Animal Hospital Association, the first Monday of each month, at alternating hospitals. W. F. Noland, 7504 Metcalf, Overland Park, Kan., secretary.

Kansas City Veterinary Medical Association, the third Tuesday of each month at Exchange Hall, ninth floor, Livestock Exchange Bldg., 1600 Genessee St., Kansas City, Mo. Busch Meredith, 800 Woodswether Rd., Kansas City 5, Mo., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April at the Academy of Medicine, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Milburn Ave., Maplewood, N. J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Casa Mana in Teaneck. James R. Tanzola, Upper Saddle River, secretary.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel in Greensboro. J. W. Peace, High Point, secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month. Wm. Allen Potts, 401 W. James St., Mount Olive, secretary.

Piedmont Veterinary Medical Association, the last Friday of each month at 7:00 p.m. in Mull's Motel in Hickory, N. Car. W. W. Dickson, Box 1071, Gastonia, N. Car., secretary.

OHIO—Cuyahoga County Veterinary Medical Association, the first Wednesday of each month, September through May (except January), at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. Ed. R. Jacobs, 5522 Pearl Rd., Cleveland, Ohio, secretary.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month except July and August. James M. Brown, 2818 W. Britton Rd., Oklahoma City, secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brookside State Bank, Tulsa, Okla. Merle S. Watts, 5302 E. 11th St., Tulsa, Okla., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine, 39th and Woodland Ave., Philadelphia 4, Pa. Raymond

(*Continued on p. 32*)

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(COMING MEETINGS—*continued from p. 31*)

C. Snyder, 39th and Woodland Ave., Philadelphia 4, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. J. Marvin Prewitt, 4141 Lexington Blvd., Corpus Christi, Texas, secretary.

VIRGINIA—Central Virginia Veterinarians' Association, the third Thursday of each month at the William Byrd Hotel in Richmond at 8:00 p.m. M. R. Levy, 312 W. Cary St., Richmond 20, Va., secretary.

Southwest Virginia Veterinary Medical Association, the first Thursday of each month. I. D. Wilson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Tuesday of each month in the Trinity Episcopal Church, 8th and James St., Seattle, Wash. P. R. Des Rosiers, 5508 2nd Ave., N. W., Seattle 7, Wash., secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. Jo Walker, Agriculture Experiment Station, Puyallup, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W., Huntington, W. Va., secretary.

WISCONSIN—Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. George F. Lynch, 201 West Devon St., Milwaukee 17, Wis., secretary.

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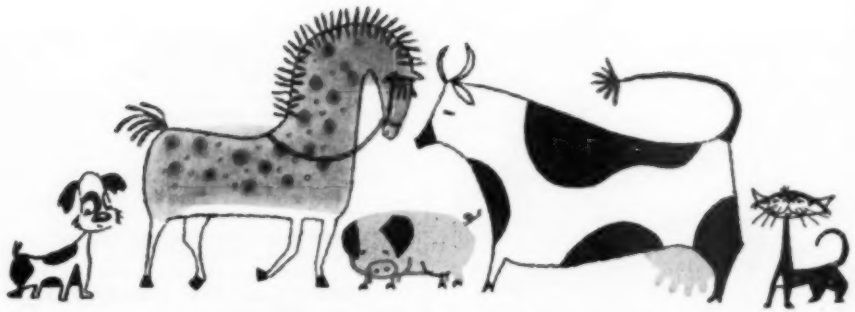

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1. Rachman, M., and Frucht, T. R.: Vet. Med. *49*:341, 1954.
2. Sternfels, M.: Vet. Med. *50*:82, 1955.

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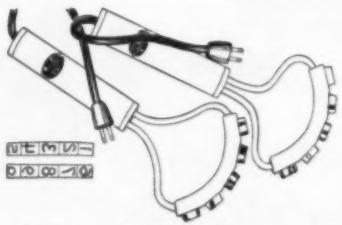

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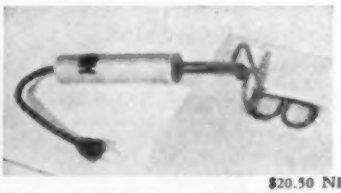

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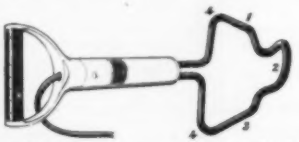

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Veterinarian wanted with Kansas license in primarily small animal practice; experience with large animals desirable. Salary commensurate to ability and experience. Permanent arrangement possible after one year. Address Dr. John S. Haley, 109 W. 29th St., Topeka, Kan.

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Assistant veterinarian wanted in Cleveland small animal hospital. State references and particulars in first letter; Ohio license necessary. Address "Box H 13," c/o JOURNAL of the AVMA.

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Veterinarian wanted for mixed practice in Pennsylvania; salary, $4,800 to start. Car furnished or will pay mileage. Address "Box H 16," c/o JOURNAL of the AVMA.

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Assistant veterinarian wanted in poultry pathology diagnostic laboratory. Address Dr. O. Schwabe, Vineland, N.J.

(Continued on p. 36)

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Non-irritating liquid adhesive
for strapping and padding
Send for Sample
The MOWBRAY COMPANY,
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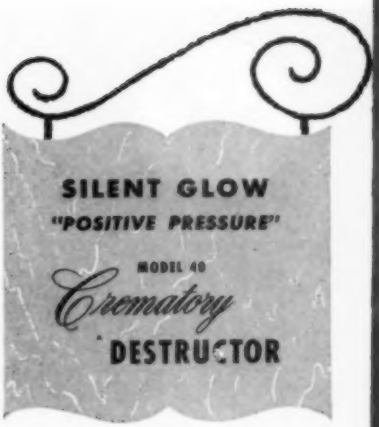
the positive answer to your disposal problems . . .

WITHOUT SMOKE, ODOR OR FLY-ASH



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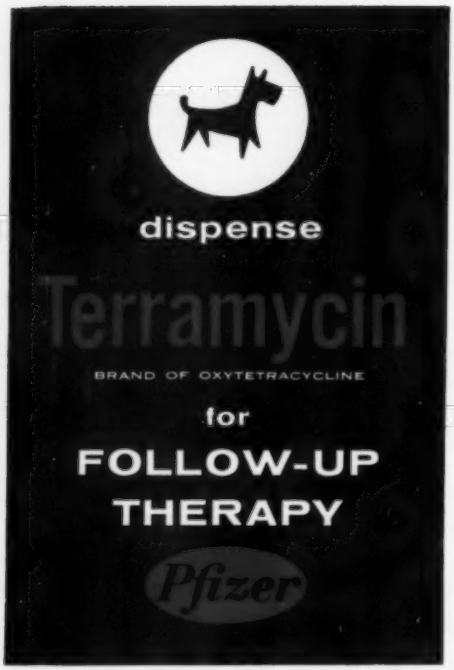

(CLASSIFIED ADS—*continued from p. 34*)

Serologist wanted, B.S. or M.S. in bacteriology and in immunology. Experience: at least 2 years in a laboratory performing serological work such as preparation of hyperimmune serums, complement-fixation tests, serum-neutralization tests, etc. Employment conditions: beginning approximately $7,200 P.A. tax free, plus family allowances. Duration: initial period 2 years. Location: Pan American Foot and Mouth Disease Center, Rio de Janeiro, Brazil. Apply in writing to: Pan American Sanitary Bureau, Regional Office of the World Health Organization, 1501 New Hampshire Ave., N.W., Washington 6, D.C.

Remittance must accompany advertisement

Assistant veterinarian wanted for modern small animal hospital in Chicago. State age, marital status, personal data, professional references, salary expected, and any experience. Possibility of future partnership present. Address "Box J 2," c/o JOURNAL of the AVMA.

Veterinarian wanted, small animals, experience unnecessary; recent graduate, June graduate acceptable. Salary and percentage. Washington, D.C. area; Maryland license necessary. Address "Box J 7," c/o JOURNAL of the AVMA.

Assistant veterinarian wanted in Detroit area; must diagnose, operate, treat small animals exclusively and conduct routine laboratory tests. Salary commensurate with ability. Address "Box J 8," c/o JOURNAL of the AVMA.

(*Continued on p. 38*)

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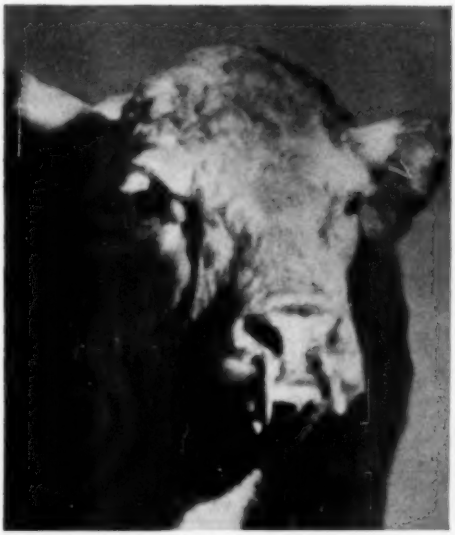


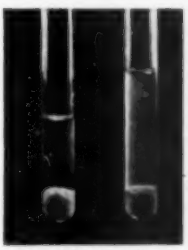
BEFORE DORNAVAC

AFTER DORNAVAC

By its enzymatic action DORNAVAC aids healing of local infections. DORNAVAC (1) liquefies purulent debris, permits drainage, (2) acts on extracellular accumulations and separates disintegrating cells from living tissue; however, it does not act on living tissue, (3) can be used with antibiotic therapy—the liquefying action of DORNAVAC aids diffusion of the soluble antibiotic at the source of infection, (4) enzymatic preparations of pancreatic origin are free of the side effects usually attributable to those of streptococcal origin.

When DORNAVAC is used in the treatment of rhinotracheitis it may be administered by instilling into the nostril or preferably by injecting directly into the trachea.

DORNAVAC is also effective in the local treatment of mastitis, abscesses, wounds, and sinusitis —may be either injected directly into infected cavities or applied as a wet dressing.



Purulent debris—before action of DORNAVAC

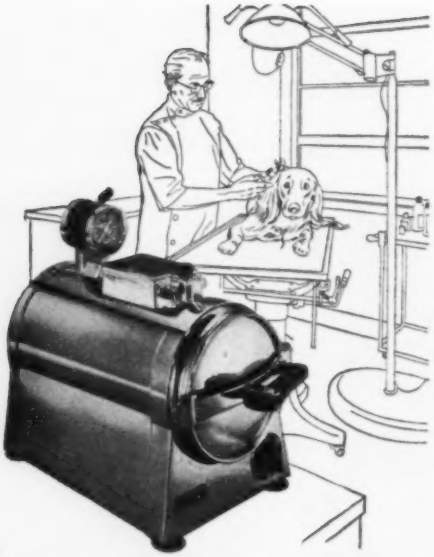
Liquefaction of debris—after action of DORNAVAC

Supplied:—Package of 1 vial containing 100,000 units of lyophilized pancreatic dornase together with one 10-cc. vial of sterile diluent.

SHARP & DOHME

Philadelphia 1, Pa.
DIVISION OF MERCK & CO., INC.

VETERINARY DEPARTMENT, U.S. VET. LICENSE NO. 3



Better sterilization . . . to help you stop *Infectious Hepatitis*

No telling when one of your patients may be a carrier of a Hepatitis-causing virus. It is highly infectious.

Cases show this virus is not airborne. It is transmitted by contaminated instruments. Proper sterilization of needles and instruments is an important step in preventing its spread to other animals.

Autoclave sterilization—once expensive—is now available at a price you can afford. Castle's new "777" Speed-Clave, fully automatic and all stainless steel, costs just $224-$227.

Portable—it weighs 15 lbs. Saves time—gets to sterilizing temperatures in 4-8 minutes!

Get the full story. Mail coupon below.

to: Wilmot Castle Co.
1766 E. Henrietta Rd., Rochester, N. Y.

☐ Send folder on "777" Speed-Clave

Name_____

Street_____

City_____ State_____

My veterinary supply dealer is:_____

Castle LIGHTS AND STERILIZERS

(CLASSIFIED ADS—*continued from p. 36*)

Wanted—Positions

Graduate Missouri, June 1956, desires position which gives opportunity for future; veteran, married, aggressive. References if desired. Address "Box J 1," c/o JOURNAL of the AVMA.

Colorado graduate, 1954, married, desires position in mixed or small animal practice in Colorado or nearby states upon completion of military service August 31. Address "Box J 3," c/o JOURNAL of the AVMA.

Graduate, 1955, wants position in mixed practice, predominantly large animals, that could develop into partnership. Licensed in Nebraska, Colorado, Kansas. Address "Box J 5," c/o JOURNAL of the AVMA.

Graduate, 1954, seeks position in small animal practice in eastern state; licensed Georgia and Maryland. Available September 1 after separation from Air Force; 27, single. Address "Box J 9," c/o JOURNAL of the AVMA.

Qualified veterinarian, experienced in small and large animal work, licensed in Arkansas, desires position with progressive veterinarian anywhere. Address "Box J 10," c/o JOURNAL of the AVMA.

Available now. Desire small animal, general practice, or institutional work. Licensed Florida, Georgia, Alabama. Married. Three years of small animal experience. Address "Box J 12," c/o JOURNAL of the AVMA.

(*Continued on p. 40*)

Moving?

If so, let us know your new address at least five weeks in advance.

And when you write, be sure to enclose an old address label clipped from a recent JOURNAL envelope. It will help us give you better service.

Send your change of address to the JOURNAL of the American Veterinary Medical Association, 600 S. Michigan Ave., Chicago 5, Ill.

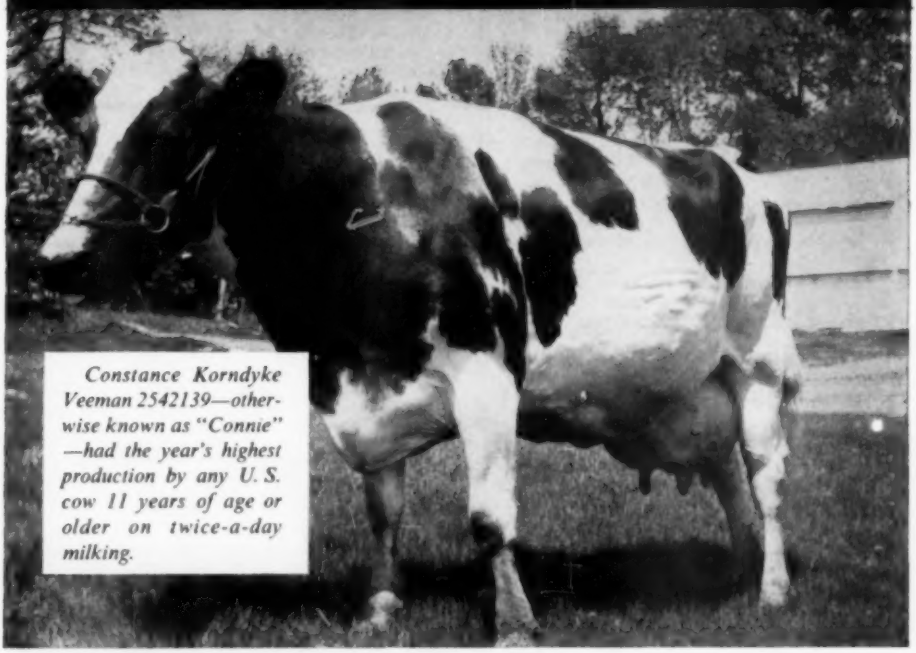
M·A·C

Quick relief for Bone, Bursal or Tendon Lameness

Single Bottle.....$2.00
3 and 1 free.....5.00
6 and 2 free.....9.00
12 and 4 free.....17.00
24 and 4 free.....28.00

CARTER-LUFF CHEMICAL CO.
Hudson, N. Y.

CONNIE'S COMEBACK PROVES DAIRY CATTLE NEED FOR VIA-D-MINERAL!



Constance Korndyke Veeman 2542139—otherwise known as "Connie"—had the year's highest production by any U. S. cow 11 years of age or older on twice-a-day milking.

Recurrent milk fever almost doomed "Connie" to be lowest-producing cow in the prize herd of Mr. and Mrs. Ronald Chapman, Emmetsburg, Iowa. But their veterinarian recommended a ration fortified with Via-D-Mineral—and results more than proved his wisdom!

Not only highest producing U. S. cow for her age, "Connie" also won honors as all-time high producing Iowa dairy cow, 2nd highest cow in the nation for milk production on twice-a-day milking, and 4th highest in the nation for butterfat production on twice-a-day milking.

It's another case of Via-D-Mineral proving to be the key to high milk and butterfat production. Credit should be given to both the veterinarian who prescribed it and the owner who followed his professional advice.

VIA-D-MINERAL, containing 64,000 USP units of vitamin D_2 per pound, is generally fed to dairy cattle, but is also valuable to all 4-footed animals.

SOLD TO VETERINARIANS ONLY

VITAMINERAL PRODUCTS COMPANY

PEORIA 3, ILLINOIS

Dependable supplement feeds since 1915

Liability Insurance

for

AVMA Members

The policy, which was developed especially for Association members two decades ago, provides expert defense against claims and suits arising out of the care and treatment of animals, and will pay, to the extent of the policy limits, all expenses and damages resulting from unfavorable verdicts.

In this suit-conscious age, such protection is not only wise but, as shown by the claim files, a practical necessity.

The insurance is placed with one of the largest and most reliable underwriters in the country.

Write at once for an application and descriptive folder.

American Veterinary Medical Association

600 So. Michigan Ave., Chicago 5, Ill.

(CLASSIFIED ADS—*continued from p. 38*)

Experienced small animal practitioner, 1950 graduate, California license, desires position in hospital in Los Angeles or San Diego area. Address "Box J 13," c/o JOURNAL of the AVMA.

Position wanted in large animal practice or in veterinary research by Israeli student graduating with veterinary degree this June from University of California. Married, 28 years old, have B.S. degree in animal science. Ready to work any place in United States. Address P. Rippin, 111 G Street, Davis, Calif.

Wanted—Practices

Small animal practice wanted in western New York; must be a going, established practice completely equipped. Substantial down payment. Address "Box E 7," c/o JOURNAL of the AVMA.

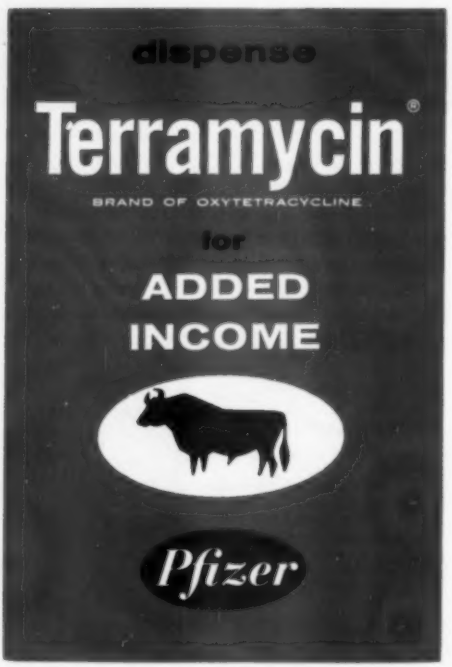
Veterinarian, 30, wishes position or purchase of good mixed practice in northern Middlewest; 4 years of experience; married. Address "Box J 4," c/o JOURNAL of the AVMA.

Want to buy predominantly small animal practice in Pennsylvania, New York, or New England. Must be active, lucrative practice; ample capital available. Address "Box J 6," c/o JOURNAL of the AVMA.

For Sale or Lease—Practices

Wisconsin dairy practice for sale, with or without real estate. Details furnished on request. Address "Box E 12," c/o JOURNAL of the AVMA.

(*Continued on p. 46*)



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for effective one-dose protection and treatment against these 3

DISTEMPER

INFECTIOUS HEPATITIS

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(contains neutralizing antibodies with a minimum titer of 1 to 500 against Leptospira Canicola Sp.)

NOW — a new FROMM development . . . TRIVALENT SERUM! By administering TRIVALENT serum a quick, passive immunity is provided against *all three* of the major infectious diseases of dogs.

ALWAYS inject FROMM TRIVALENT when the symptoms of your dog patients indicate that complete protection is needed against these three — distemper — infectious hepatitis — *and leptospirosis.*

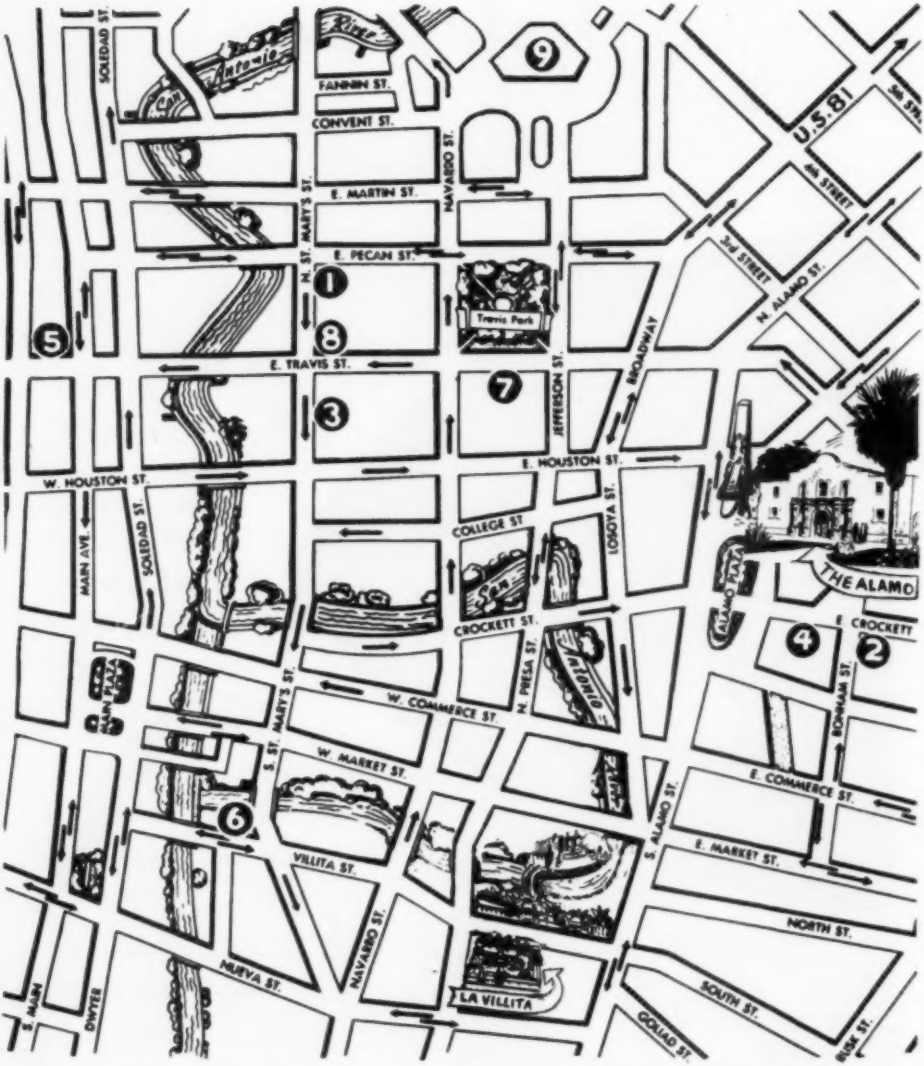
- *Sold only to Qualified Graduate Veterinarians*
- *Supplied in 50 cc. and 100 cc. vials*

CONTACT YOUR LOCAL DISTRIBUTOR

FROMM LABORATORIES, INC.

Grafton, Wisconsin, U.S.A.

Hotel Map of San Antonio



1. Blue Bonnet Hotel
2. Crockett Hotel
3. Gunter Hotel
4. Menger Hotel
5. Robert E. Lee Hotel
6. Plaza Hotel
7. St. Anthony Hotel
8. White Plaza Hotel
9. Auditorium

Motel Information—Motels listed on the reservation form are located on Austin Highway, U.S. 81, which enters San Antonio via Broadway. Rio Lado Motel is at 1100 N. St. Mary's St., near the business section.

HOTEL RESERVATIONS — SAN ANTONIO CONVENTION

Ninety-Third Annual AVMA Meeting, Oct. 15-18, 1956

All requests for hotel accommodations will be handled by a Housing Bureau in cooperation with the Committee on Local Arrangements. The Bureau will clear all requests and confirm reservations.

Hotels—Motels and Rates (all are air-conditioned)

HOTEL	SINGLE	DOUBLE	TWIN BEDS
1. Blue Bonnet	$3.00-5.00	$5.00-8.00	$ .....
2. Crockett	$3.50-4.50	$5.50-6.50	.....
3. Gunter	$5.00 and up	$6.50 and up	.....
4. Menger	$5.00-8.00	$7.00-12.00	.....
5. Robert E. Lee	$3.50-5.00	$5.00-6.00	$6.00-8.00
6. St. Anthony	$5.00 and up	$7.00 and up	.....
7. White Plaza	$3.25 and up	$4.75 and up	.....

MOTEL	RATES
1. Aero	$7.50-9.00
2. Aloha	$6.00 and up
3. Belvedere	$6.00-10.00
4. Casa Linda	$6.00 and up
5. Koronado	$5.00 and up
6. Park	$4.00-15.00
7. Rio Lado	$5.00-10.00
8. The Westerner	$5.00 and up
9. Flamingo	$6.00 and up

Tear Here

RESERVATION FORM — AVMA CONVENTION — SAN ANTONIO

To: HOUSING BUREAU, San Antonio Visitors and Information Department, Chamber of Commerce, Insurance Building, San Antonio 5, Texas.

Please make reservations indicated below:

HOTEL

————Single room(s) at $.....

————Double bed room(s) at $.....

————Twin-bed room(s) at $.....

————Suite (specify type of accommodations wanted)

(Three choices MUST be shown)

First choice hotel ————————

Second choice hotel ————————

Third choice hotel ————————

MOTEL

Indicate type of accommodations

(————————————)
Unit, Cabin,

wanted for ———— persons at $————
No. rate

(Three choices MUST be shown)

First choice motel ————————

Second choice motel ————————

Third choice motel ————————

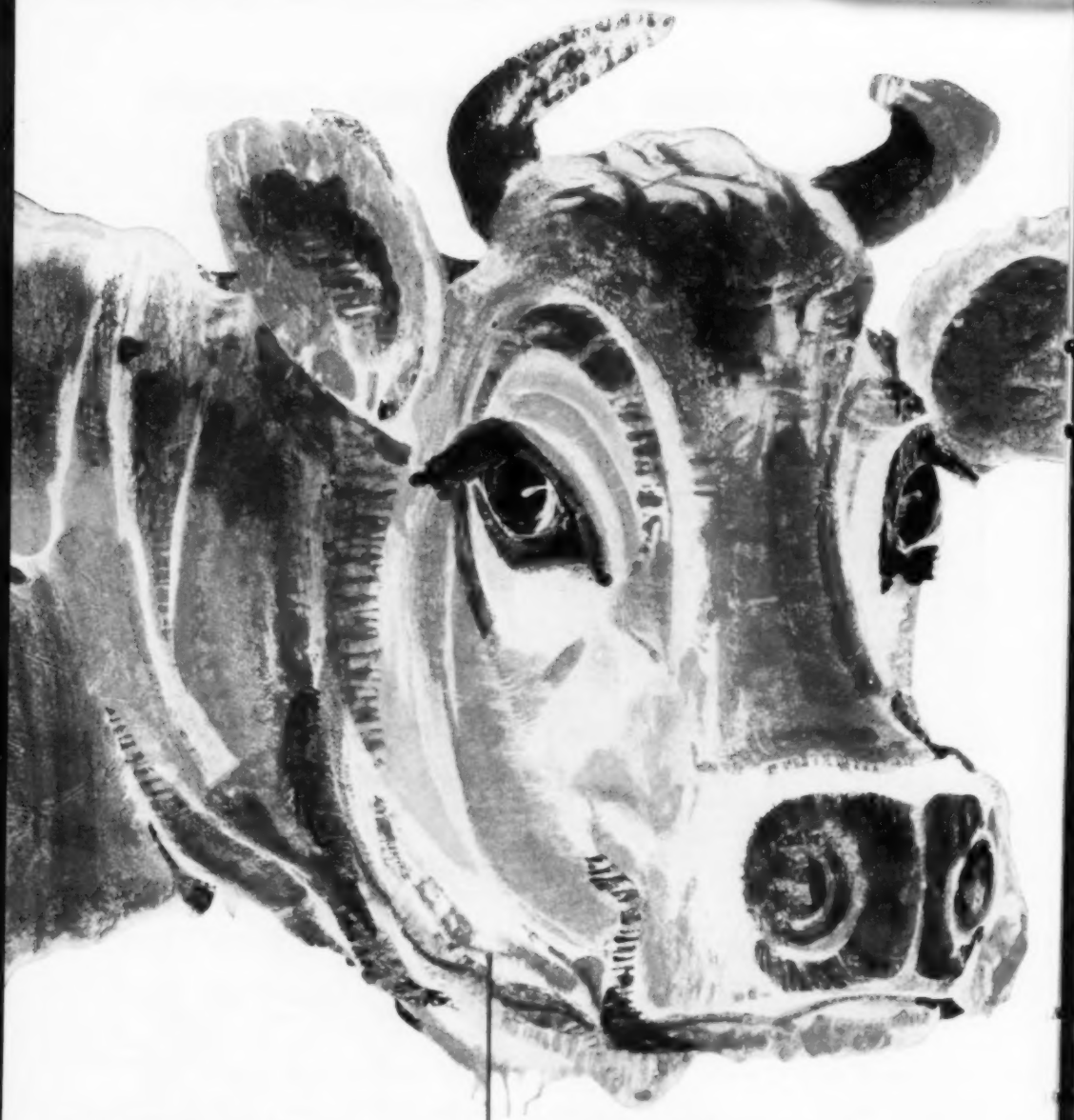
Arriving on (date) ———— at ..... a.m. ..... p.m.

Leaving on (date) ———— at ..... a.m. ..... p.m.

Will be occupied by (attach list of additional names if necessary).

Your Name (Print or Type) ————————

Street Address ..... City and State or Province ————————



POLYOTIC INTRAMUSCULAR:
100 mg.-500 mg.-1 Gm.-5 Gm.
POLYOTIC INTRAVENOUS: 100 mg.-2.5 Gm.
POLYOTIC OBLETS®: 4's-6 x 4's
POLYOTIC CAPSULES: 50 mg., 25's-100's;
100 mg., 100's; 250 mg., 16's-100's
POLYOTIC TABLETS: 50 mg., 25's-100's;
100 mg., 25's-100's; 250 mg., 16's-100's
POLYOTIC MASTITIS OINTMENT ¼ oz.
POLYOTIC COMPOUND MASTITIS OINTMENT: ¼ oz.
POLYOTIC OPHTHALMIC OINTMENT 1%: 6 x ⅛ oz.
POLYOTIC POWDER 2%: 35 Gm.
POLYOTIC TOPICAL OINTMENT 3%: 1 oz.
POLYOTIC SOLUBLE (Tinted) POWDER:
¼ lb.-½ lb.-1 lb.-5 lb.
AVIANIZED® RABIES VACCINE: (Canine):
1 dose-5 x 1 dose-10 doses-100 doses
AVIANIZED RABIES VACCINE: (Cattle): 10 doses
AVIANIZED CANINE DISTEMPER VACCINE:
1 dose-10 x 1 dose

ANTI-CANINE DISTEMPER SERUM AND ANTI-INFECTIOUS
CANINE HEPATITIS SERUM: 100 cc.
INFECTIOUS CANINE HEPATITIS VACCINE: 2 cc.-10 cc.
BRUCELLA ABORTUS VACCINE: 1 dose-5 x 1 dose-
5 doses (25 cc.)
FELINE DISTEMPER VACCINE: 1 immunization (2 vials
Vaccine, 2 vials Sterile Diluent, 2 cc.)
ANTI-FELINE DISTEMPER SERUM: 10 cc.
CARICIDE® Diethylcarbamazine TABLETS:
400 mg., 25's
DIETHYLSTILBESTROL SOLUTION: 10 cc.-50 cc.
LEPTOSPIRA CANICOLA-ICTEROHEMORRHAGIAE BACTERIN
Whole Culture Inactivated:
1 dose
Other products to be added.

LEDERLE PROFESSIONAL LINE

Lederle

The Practicing Veterinarian is the Key man in any Rabies Control Program

1 **AVIANIZED® RABIES VACCINE Modified Live Virus (Chick Embryo Origin)—Vacuum-Dried *Lederle.* For dogs only.**

The control of rabies requires the vaccination of a minimum of 7 out of 10 dogs. In areas where practicing veterinarians have been able to achieve this goal using AVIANIZED Rabies Vaccine there has been a marked reduction in rabies incidence, human deaths and number of antirabic treatments.

2 **AVIANIZED® RABIES VACCINE Modified Live Virus (Chick Embryo Origin)—Vacuum-Dried *Lederle.* For cattle only.**

The problem of rabies in cattle is becoming increasingly important in the United States. The U.S.D.A. has reported 1,931 laboratory-confirmed cases for the years 1952 and 1953. The WHO Expert Committee on Rabies has reported high-egg-passage Lederle-Flury strain Rabies Vaccine for cattle to be antigenic and devoid of pathogenic properties. In field trials during the past 3 years, on over a thousand head, immunity has been demonstrated by challenge (68% survivors vs. 25% in controls).

The practicing veterinarian is more liable to day-to-day rabies exposure than any other professional group.

3 **RABIES VACCINE**—Semple Vaccine *Lederle.*

For use by physicians in antirabic (Pasteur) treatment of exposed persons.

4 **Antirabies Serum *Lederle.***

For use by physicians in antirabic treatment of exposed persons as indicated. Now available, cost-free to exposed veterinarians through their local veterinary associations.

AVAILABLE TO VETERINARIANS ONLY

LEDERLE LABORATORIES DIVISION | AMERICAN CYANAMID COMPANY | PEARL RIVER, N.Y.

Correspondence

March 8, 1956

Dear Dr. Aitken:

I noted your item regarding the new antibiotic "streptonivicin." I am wondering if you are aware that this name has been discontinued. Novobiocin is the new generic name for this antibiotic, replacing streptonivicin (discovered by Upjohn) and cathomycin, the identical antibiotic which was discovered by Merck.

The new trade names are albamycin (Upjohn brand), cathocin (Merck's brand), and cardelmycin (Pfizer's brand). The latter company also announced the discovery of this antibiotic but later studies confirmed that all three agents were identical.

New developments in the field of antibiotics are so rapid that it is becoming difficult to keep abreast. For example, among the recent antibiotics, four have been shown to possess definite action against neoplasms: actinomycin, azerine, sarkomycin, and carzinophilin. This activity is an extension of their potent bacteriocidal (cell-destroying) effect.

Very truly yours,
s/ R. F. Vigue,
Bronxville, N. Y.

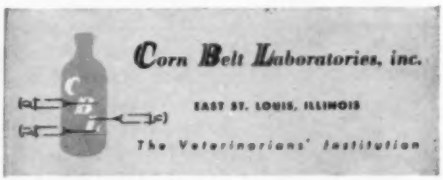
(CLASSIFIED ADS—*continued from p. 40*)

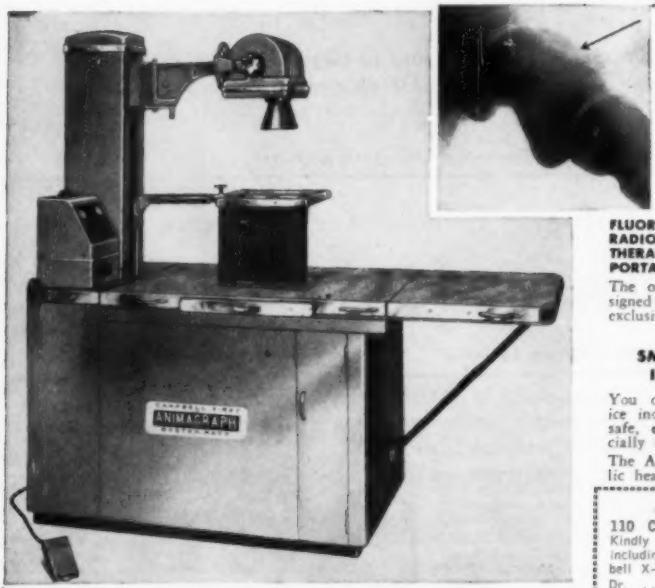
Well-established practice for sale in Maryland; 75% dairy, with small animal increasing rapidly. High-type clientele, excellent working conditions. Grossed over $22,000 last year. Practice, residence, and drugs $30,000. Real estate value alone $22,500. Practice available June 1; will assist during June; $15,000 will handle. Address "Box H 1," c/o JOURNAL of the AVMA.

Mixed practice for sale in Indiana; 85% large animals. Six-room home, 4-room office combination; $5,000 down will handle. Address "Box H 7," c/o JOURNAL of the AVMA.

Established, rapidly expanding, small animal practice for sale in best, smog-free southern California climate; well built, 2-year-old clinic building of pleasing design. Fine opportunity for capable veterinarian; realistic terms to right man. Address "Box J 11," c/o JOURNAL of the AVMA.

(*Continued on p. 47*)





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MAKE SURE THE X-RAY MACHINE YOU BUY REFLECTS SOME THOUGHT OF THE VETERINARIAN IN ITS DESIGN

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ANIMAGRAPH
TRADE MARK REG. U.S. PAT. OFF.
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4 Outfits in 1

FLUOROSCOPY (motion pictures)
RADIOGRAPHY (still pictures)
THERAPY (for skin treatment)
PORTABLE (large animals outside)

The only complete x-ray machine designed from the ground up for the exclusive use of the veterinarian.

THE BETTER GRADE
SMALL-ANIMAL HOSPITALS
INSTALL ANIMAGRAPHS

You owe your clients complete service including x-ray. You owe yourself safe, efficient apparatus designed especially for your use.

The Animagraph is a necessity to public health.

Use This Coupon.

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Kindly send me descriptive information, including prices and terms, on the Campbell X-Ray Animagraph.
Dr. .....
(Please Print)
Address .....
.....
(City and State)

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—repaired in bottom clipper blades. Top and bottom blades sharpened to match. Save money—Guaranteed. Prices on Request

HIGHLY SPECIALIZED SHARPENING

Sales—Repairing on Oster and Stewart clippers.

Sharpened Blades Tested on Rabbit For

OSTER A 2 $ 75 STEWART $1 00

Prompt Service—Est. 17 years

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CARROT OIL VITAMINS

Details the advantages of carrot oil vitamins when used in feeds to improve breeding results; to destroy oxidized milk flavors; and to promote general good health and glossy coats. Contains much information. Replete with data and references. Send for it today.

NUTRITIONAL RESEARCH ASSOCIATES
Dept. 251-M. South Whitley, Indiana

(CLASSIFIED ADS—*continued from p. 46*)

Excellent mixed practice for sale; active 30 years in southern Minnesota. Price based on drugs, instruments, equipment, office, and real estate. Reason for selling, health. All replies confidential. Address "Box J 14," c/o JOURNAL of the AVMA.

Small animal hospital with apartments for sale or lease. New York City; excellent clientele. Address "Box J 15," c/o JOURNAL of the AVMA.

Miscellaneous

Breedersleve—The disposable obstetrical sleeve. Package of 20 with detachable chest band, $5.00; lower wholesale prices. Free sample upon request. Breeders Equipment Co., Flourtown, Pa.

Opportunity to buy veterinary mobile unit with four-wheel drive complete for $2,620—excellent condition. 21,000 miles, extras included. Write or call Baldwin Veterinary Hospital, RFD 2, Putney, Vt., telephone Brattleboro, Alpine 45422.

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IMPROVED 7 CAGE DELUXE DRAIN UNIT

The small size is 7½ feet long with 3 — 30" cages in bottom and the large unit 9 feet long with 3 — 36" cages in bottom.

Cages are seamless. Sections can be built in long rows without legs as "BUILT-IN" Cages.

Also you can buy separate seamless compartments and doors any size.

Our units are available in 3, 5, 7, or 12 cage units, or any combination you need.

We don't make all the cages but we make the best.

Write for NEW cage booklet, also DRYER FOLDER

Baltimore Wire and Iron Works

319 Barrow Street **Jersey City 2, N.J.**

A safe, dependable powder or tabole formulation...

EMBLO

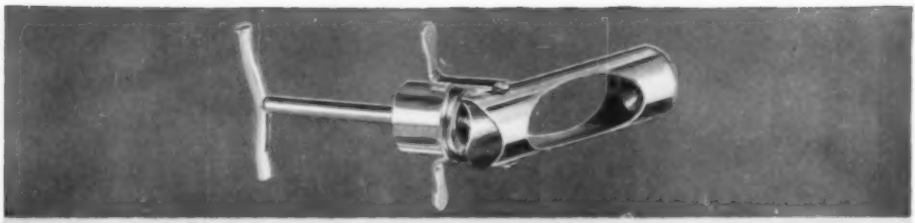
...for bloat and other digestive dysfunctions.

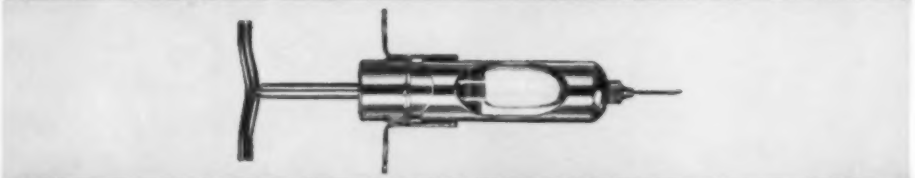
In the treatment of digestive dysfunctions, or bloat resulting from the ingestion of green corn, alfalfa, or other legumes, polymerized methyl silicone increases the surface tension of the reticulo-ruminal fluid. This causes a release of the trapped gas, making it available for eructation.

Magnesium citrate and magnesium hydroxide provide antiferment, antacid and mild laxative action. The Emblo formulas are indicated to restore appetite and rumen function in cows off feed, bloating feedlot steers, or convalescent animals.

Emblo acts quickly and safely... is easy to administer, and makes an ideal dispensing item.

HAVER-GLOVER *Laboratories*
KANSAS CITY, MO.





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Another Lockhart FIRST!

AUTOJET is our new one-piece cartridge syringe for use with the new Alogen and Alogen H disposable cartridges.*

- **Quick and easy to use**
- **Highly Compact**
- **Permits More Aseptic Technique**

With the AUTOJET you simply break the back of the syringe, insert cartridge and the AUTOJET is ready for use. After vaccination, discard old cartridge and repeat process for next injection. In addition to use with Alogen and Alogen H, the AUTOJET syringe is adaptable to smaller cartridge vials of Alotab (Feline Distemper Vaccine).

***ALOGEN**—Canine Distemper Vaccine in Bronchisepticus-Streptococcus-Typhimurium Bacterin.

ALOGEN H—Canine Distemper and Infectious Canine Hepatitis Vaccine in Bronchisepticus-Streptococcus-Typhimurium Bacterin.

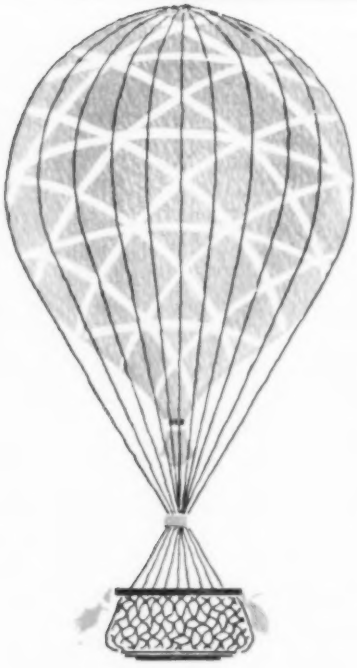
ALOTAB—Feline Distemper Vaccine.

Alogen, Alogen H, and Alotab come in disposable cartridges that are **usable in the AUTOJET syringe or with old-fashioned syringes just as you would any other vial.**

LOCKHART

"Better Biologics for Graduate Veterinarians"

ASHE LOCKHART, INC. • 800 WOODSWETHER ROAD, KANSAS CITY 5, MO.



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blood calcium
levels
are indicated

DCM

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carries them **higher** . . . and keeps them high **longer!**

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